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# Construction

## Methods and Equipment

McGraw-Hill Publishing  
Company, Inc.

May, 1938

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NECHES RIVER BRIDGE at Port Arthur, Tex., has long approaches erected by narrow deck travelers equipped with 90-ft. booms. Construction canals alongside bridge permit steel delivery in barges.

### DISCUSSION OF BUILDING COSTS BY:

SUMNER S. BOLLETT

JOHN W. COWPER

COL. HORATIO B. HACKETT

ANDREW J. EKEN

A. F. GREENSFELDER

C. F. WOOD

W. G. LUCE

WILBUR F. CREIGHTON

ROLLAND J. HAMILTON

H. K. FERGUSON

JOHN GRIFFITHS

S. M. SIESEL

### HIGHWAY MAINTENANCE BY MODERN METHODS

By J. E. LAWRENCE, Maintenance Engineer,  
Massachusetts Department of Public Works

### CONSTRUCTION STANDARDS FOR HOME DEVELOPMENT IN WASHINGTON, D. C.





# 30 STEAM HAMMERS

## Raced Against a Coming Flood

### —INLAND PILING Played its Part

In 100 days 19,000 tons of steel sheet piling had to be set up and driven. The contractor had to complete his cofferdam before high water.

Thirty steam hammers were mobilized for the job. The frame shown in the picture proved to be an economical way of concentrating their operation.

Driving was so hard in places that as many as 400 blows per foot were required for penetration through the hard subsoils.

Inland Steel Piling sections were used throughout. To withstand such punishment the piling had to be good!

Take no chances on your next piling job. Check its requirements with experienced Inland engineers. Their helpful suggestions and co-operation are freely offered and often lead to important savings of time and money.



# INLAND STEEL CO.

38 SOUTH DEARBORN STREET, CHICAGO  
DETROIT • KANSAS CITY • MILWAUKEE • ST. LOUIS • ST. PAUL

SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES  
STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS



# CURRENT JOBS

... and Who's Doing Them

## BUILDINGS

**Commercial**—A big housing development in the form of garden apartments in the Borough of the Bronx, New York City, to cost \$35,000,000 was announced by the Metropolitan Life Insurance Co., with **Starrett Bros. & Eken, Inc.**, of New York, as the contractors. In Oklahoma City, **Warr Realty Co.** is building 700 one-story brick and timber houses to cost \$2,800,000. Office building in Rockefeller Center, New York, to cost \$2,500,000 has been started by **John Lowry, Inc.**, of New York City. In Columbus, Ohio, a \$2,000,000, brick apartment housing project is under construction by **LeVeque Co.**, of Columbus. In Nichols Hills, Okla., **G. A.**

**Nichols Co.** is engaged upon a \$1,750,000 development of 380 houses. A \$1,600,000 housing development in Chicago is being built by **Behlmar Engineering Corp.**, of Chicago, for **Winnemac Gardens Corp.** **Lake Intervale Corp.** is busy on a \$1,050,000 housing project at Troy Hills, N. J. In Los Angeles, **William Simpson Construction Co.**, of Los Angeles, is building a \$1,000,000 department store. **Mott Bros.** have a \$1,000,000 project for 300 houses at Manhasset, N. Y.

**Industrial**—For the Swift Canadian Co., Ltd., at St. Boniface, Man., Canada, **Bird Construction Co.**, of Regina, is building a \$2,000,000 plant. International Nickel Co., is spending \$1,500,000 for an ore mill at Sudbury, Ont., which **Dominion Bridge Co.** is

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WILLARD CHEVALIER, Vice-President

MAY, 1938

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Editor

A. E. PAXTON  
Manager

Editorial Staff: Vincent B. Smith, Paul Wooton (Washington),  
Nelle Fitzgerald

building. Award of \$1,000,000 was made to **H. K. Ferguson Co.**, of Cleveland, for a plant in Hoboken, N. J., for General Foods Corp. At Dallas, Tex., **Inge Construction Co.**, of Dallas, is putting up a \$800,000 Coca Cola plant building.

**Public**—State college buildings at State College, Pennsylvania, to cost \$2,598,000 have been awarded to **McCloskey & Co.**, of Philadelphia. A \$1,469,000 tuberculosis hospital at Butler, Pa., went to **Matthews Cummings**, of Boston, Mass. Prison at Mount Gretna, Pa., was bid in by **John McShain, Inc.**, of Philadelphia, for \$2,286,000. A state office building at Denver, Colo., is under construction by **F. J. Kirchhoff Construction Co.**, of Denver, for \$774,450. For a public school in Brooklyn, N. Y., **H. R. H. Construction Corp.**, of Brooklyn, was successful bidder at \$468,700. In Madison, Wis., a bid of \$497,000 obtained for **Jacobson Bros. Co.**, of Chicago, contract for college memorial building. Hospital building at Grafton, Mass., is under construction by **Rugo Construction Co.**, of Boston, for \$460,247. **Foster & Creighton**, of Nashville, Tenn., were low bidders at \$661,380 for prison buildings at La Grange, Ky.

ginia: For paving and bridges in Botetourt County, the **Penleton Construction Co.**, of Wytheville, Va., for \$234,687. Rhode Island: Concrete and bituminous construction on Putnam Pike to **Arute Bros., Inc.**, of New Britain, Conn., for \$217,871. Connecticut: Concrete and bituminous paving in Portland to **A. I. Savin**, for \$254,015.

## WATERWORKS

A \$10,097,135 contract was awarded by Board of Water Supply, New York City, to **S. A. Healy Co.**, of Chicago, for tunnel in Westchester County for new Delaware River aqueduct. Low bidders on other tunnel contracts for the Delaware aqueduct for New York City Water Supply were **Utah Construction Co.**, Ogden, Utah, \$10,718,530; **Seaboard Construction Corp.**, New York, (Dominion Construction Corp., Montreal, F. J. Herlihy, Chicago, and B. Perini & Sons, Framingham, Mass.) \$10,697,667; **Arthur A. Johnson Corp.** and **Necaro Co., Inc.**, New York City, \$10,757,650.

## MISCELLANEOUS

For the land section of the Queens Midtown tunnel, New York City, a bid of \$2,228,965, obtained contract for **Charles F. Vachris, Inc.**, of Corona, N. Y. Approach structures in New Jersey for the Lincoln tunnel will be built by **James Mitchell, Inc.**, of Jersey City, under a \$1,032,337 contract. Runways at Sacramento Air Depot in California are under construction by **Union Paving Co.**, of San Francisco, for \$201,500. Dredging contracts in New York and New Jersey area were let by the U. S. Engineer Department to the **Great Lakes Dredging and Dock Co.**, of New York, for \$321,689, and \$225,896 respectively and to the **Arundel Corp.**, of Baltimore, for \$630,649. In Chicago, Ill., marine works at the mouth of the Chicago River are under construction by **Kettler-Elliott Co.**, of Chicago, for \$427,144.

## HIGHWAYS

Recent highway contract awards include the following—New York: Reconstructing Manhattan bridge roadway to **Harris Structural Steel Co.**, \$727,750; concrete highway in Nassau County to **Serafini Construction Co.**, of Binghamton, N. Y., for \$585,556. Kentucky: Bituminous paving in Floyd County to **Gorman Construction Co.**, of Flemingsburg, for \$205,299; for concrete paving in Fayette County to **Regenhardt Construction Co.**, of Cape Girardeau, Mo., for \$533,437. Louisiana: Mississippi River bridge approach at Baton Rouge to **W. H. Aldrich & Co.**, of Baton Rouge, for \$208,931. Colorado: For paving in Las Animas County to **Gordon Construction Co.**, of Denver, for \$236,025. Vir-

## The "How" of it

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

- How STEEL CAISSONS for bridge pier substructure were launched and sunk by jetting through 8-in. pipes. — p. 33
- How DREDGED CANALS enabled contractor to use floating plant to build bridge piers and deliver steel. — p. 36
- How DERRICK TRAVELERS erected steel for cantilever span of long bridge. — p. 36
- How ARTIFICIAL ISLANDS of sand were built to provide for sinking of caissons by open dredging. — p. 38
- How BATTER PILES were driven by special crane-operated floating rig with 85-ft. steel leads. — p. 38
- How LUBRICATION of tractors and other heavy equipment was done on job by portable unit. — p. 41
- How RAILROAD GRADE SEPARATIONS were built, under traffic, in three stages. — p. 42
- How DEMOLITION of 20-story building was speeded by use of tractor bulldozer. — p. 46
- How CATCH-ALL below swinging scaffold intercepted falling debris during wrecking of building. — p. 46
- How DISTRIBUTION OF MATERIAL on construction job was accomplished by simple methods. — p. 48
- How BOOM-RIGGED TRACTOR delivered lumber from railroad flat car to job mill. — p. 48
- How 85-FT. BOOMS on crawler cranes erected wood roof trusses weighing 16 tons. — p. 48
- How TIMBER JIB 50 ft. long, lashed to 85-ft. crane boom, provided long reach for handling roof lumber. — p. 49
- How OBSERVATION WINDOWS in streamlined fence gave spectators view of construction operations. — p. 49
- How WELDING of bridge floor was aided by prying down steel grid to form contact with stringers. — p. 52
- How SHEETPILE EXTRACTOR was rigged on A-frame to exert pull of 150 to 200 tons. — p. 52
- How BIG PIPE SECTIONS were handled by steel truss hanging from crane hook. — p. 52
- How UNLOADING of bituminous mix from railway cars was done by ¾-yd. shovel. — p. 52
- How VOLUMETER measured yardage of paving concrete. — p. 53
- How FLOATING MIXING PLANT delivered concrete to bridge. — p. 53
- How SAFETY LADDERS prevented accidents on erection of big steel gates. — p. 53
- How TRACTOR CRANE removed uprooted trees after storm. — p. 53
- How SMALL HOUSES were built according to strict construction standards. — p. 56
- How INSULATION of rock wool, 4 in. thick, protected walls and ceilings of small houses. — p. 57
- How HIGHWAY MAINTENANCE is made effective by modern methods and equipment. — p. 60
- How DEPRESSED SLABS of concrete pavement were raised to proper grade by mud-jack. — p. 60
- How ROADSIDE IMPROVEMENT was accomplished by planting trees and shrubs and mowing center strip. — p. 61

## Are You Moving to a New Job?

Unlike workers in "indoor" industries, construction men don't stay put for any great length of time. Theirs is an "outdoor" industry, requiring frequent moves from job to job, as one project is completed and another, hundreds or thousands of miles away, begins.

Before you shove off to a new locality tell our Circulation Manager to have **CONSTRUCTION Methods and Equipment** sent to your new address. Filling out the following form will do the trick:

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# The New Federal Program

AS THIS IS WRITTEN, it looks as though the federal government is about to revive its program of public works expenditure. Just what form the effort eventually will take must be uncertain until Congress has acted on the President's proposals.

But already the recent executive pressure to curtail Federal Highway Aid has been withdrawn and the regular program is assured until July 1939. It may even be substantially increased beyond the original authorization. Then, too, it looks as though we shall have a substantial program of federal aid to non-federal projects; i.e., works for states, counties, cities, towns and other subdivisions. Such projects probably will be handled by PWA.

Of course, WPA is slated for a substantial share of the funds for an expanded program of work-relief. That is inevitable for a number of reasons, administrative, technical and political, which need not be discussed here.

But it should be noted that in this effort the President emphasizes, as never before, his purpose to revive sagging business and industry. Back in 1933-1934 his chief emphasis was on relief. The stimulating effects of federal expenditures on private business were secondary: sometimes they actually were disdained by spending authorities.

Now, however, the emphasis has shifted somewhat. While work-relief still is vital, the heavy thinkers up top are coming to recognize that the government cannot indefinitely make jobs for millions out of bank credit, that business revival to provide regular jobs and pay the governmental expenses must be the primary purpose rather than a by-product of federal policy, and that direct efforts to that end must have a leading place in the federal program. That is why an industrial lending program has been made part of the picture and that is why PWA has been recalled from the dog-house.

ALL THIS IS ENCOURAGING to the construction industry, which knows well the superior effectiveness of PWA policies in applying federal funds to stimulate private industry. For the most part, PWA expenditures have created real public values in useful works and services;

they have enabled engineers, architects, contractors and dealers in materials and equipment to hold their organizations intact; and they have given a real boost to the heavy industries when private orders dried up. These are truly helpful supports to the existing structure of industry as contrasted with efforts to alleviate human distress in an emergency. Such activities help to save the ship, not just to succor the survivors.

A recent report by the Department of Labor sheds some interesting light on the cost of such activities to the federal government. It covers more than a thousand completed PWA non-federal projects of many types. It shows that for a federal expenditure of \$61.24, one man found a month's employment either at the construction site or in some factory, mine, forestry, transportation or distributing organization. All this employment, moreover, was normal. Contractors bid the jobs in the normal way and paid prevailing wages. The indirect labor was normal private industrial employment.

THIS FEDERAL EXPENDITURE of \$61.24 per man-month is based on a 45 per cent PWA contribution toward the cost of non-federal projects. The remaining 55 per cent, or \$74.84 was paid by the communities that initiated the projects. The study showed also that such projects created more than 2½ times as much employment "behind the lines" in industry as was created at the construction site.

By such procedure, each \$61.24 of federal funds means not only a month's job for someone; it means also the normal flow of business that is necessary to hold together and activate the economic organism by which we all must live. It means normal jobs rather than emergency rations; it means orders for business rather than social welfare work; it means consistent industrial development and expansion rather than creeping socialization.

Since the professed objective of the new federal effort is to stimulate and maintain employment through revived business and industry, all this should be kept very much in mind by those who will shape its policies and direct its performance.

*Willard Chevalier*

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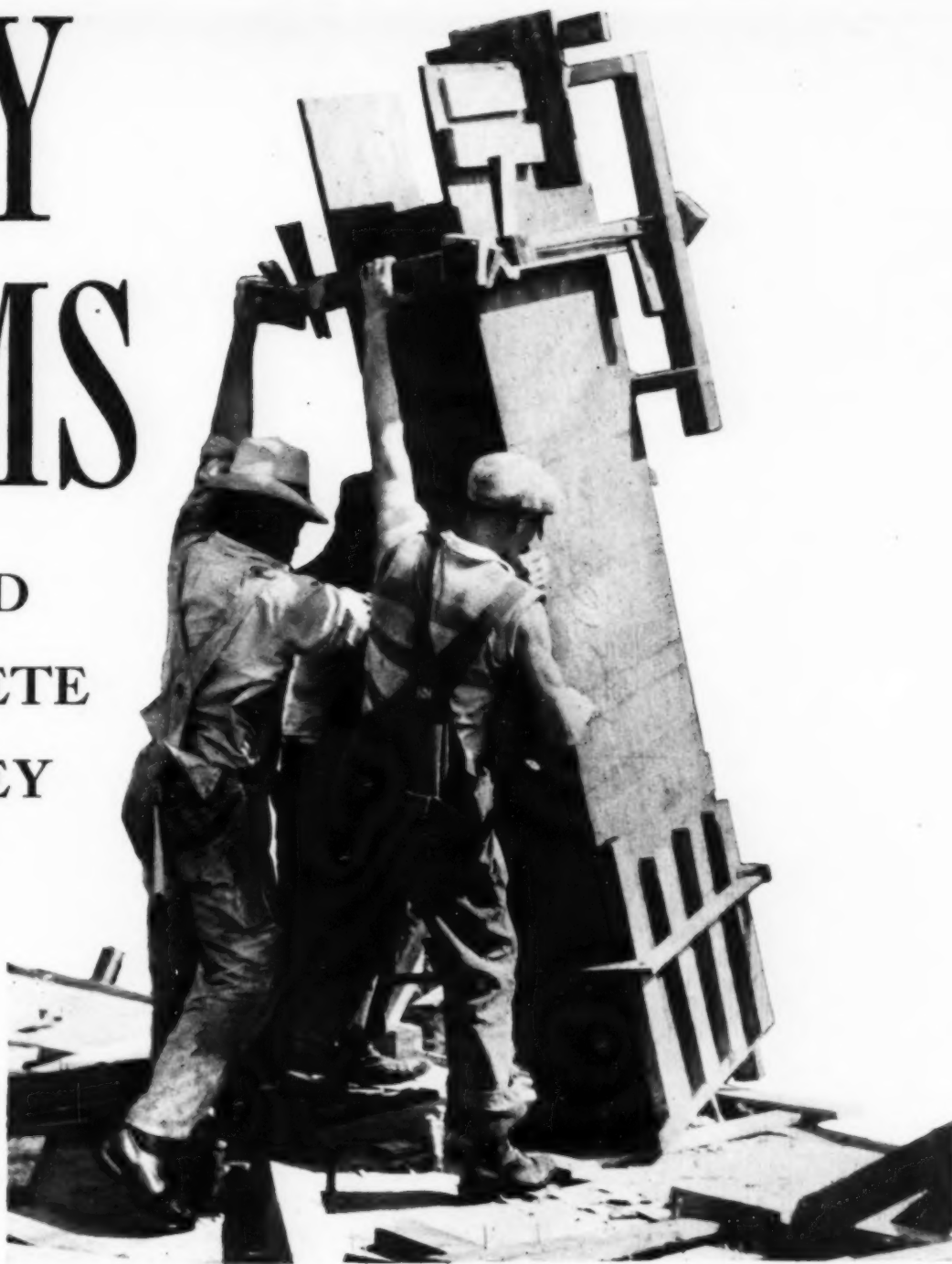
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WET CONCRETE  
MAKE MONEY  
FOR YOU



**F**ORMS are made for just one purpose, to hold wet concrete. Hence, your investment in forms is productive only during the first few hours after concrete is placed. The sooner you can strip, the lower the form cost per floor or per cubic yard of concrete. But early form removal depends primarily upon the amount and kind of cement used, which introduces the factor of total cement cost. Time costs must also be considered—for the sooner a job is completed, the lower the job overhead charged against it.

So it comes down to this: Find the erection schedule which shows the lowest overall cost, taking time, forms and cement into consideration. Unless this is done, your concrete may be costing you more than it should. Witness the fact that on six recent jobs, contractors' own cost figures show net savings of 38¢ to \$1.49 a cu. yd. of concrete, simply by figuring the cheapest erection schedule. For de-

tails, see the quick, easy method of figuring the lowest-cost erection schedule in Lone Star's new book, "Cutting Concrete Costs." On some jobs, 'Incor's\* 24-hour service strength shows the lowest overall cost; on others, it's Lone Star. Both cements give you the same high quality concrete. Lone Star Cement Corporation, Room 2265, 342 Madison Avenue, New York.

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## » » each affording *Specific Advantages*

With more refinement in the 15-ton model and the adding of the ten-ton size—Rear Dump Trac-Truks now offer even greater opportunities and advantages to the excavating contractor and material handling trade. The new 10-ton model K, particularly, expands the scope of Trac-Truk use for highway construction with its 8 yard water level capacity—rounded line body—8 foot width dimension—low overall loading height—high dumping angle—100 h.p. Diesel or gas motor—the noted Euclid full floating planetary final drive axle and amidship transmission that provides for 5 equal speeds forward and reverse.

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for their ruggedness of construction and features in design to handle the unusual demands of heavy excavation haulage. Typical of these features is the smoothly curved body and high dumping angle insuring clean, quick discharge of sticky material. Another important design feature is the exceedingly rugged, yet moderate in weight, frame construction of wide flange I-section beams with strong tubular torque members. Also, instead of the ordinary use of springs, Trac-Truk bodies are cushioned with the exclusive Euclid method of rubber mountings. All of these facts are summed up definitely in better performance and greater endurance.

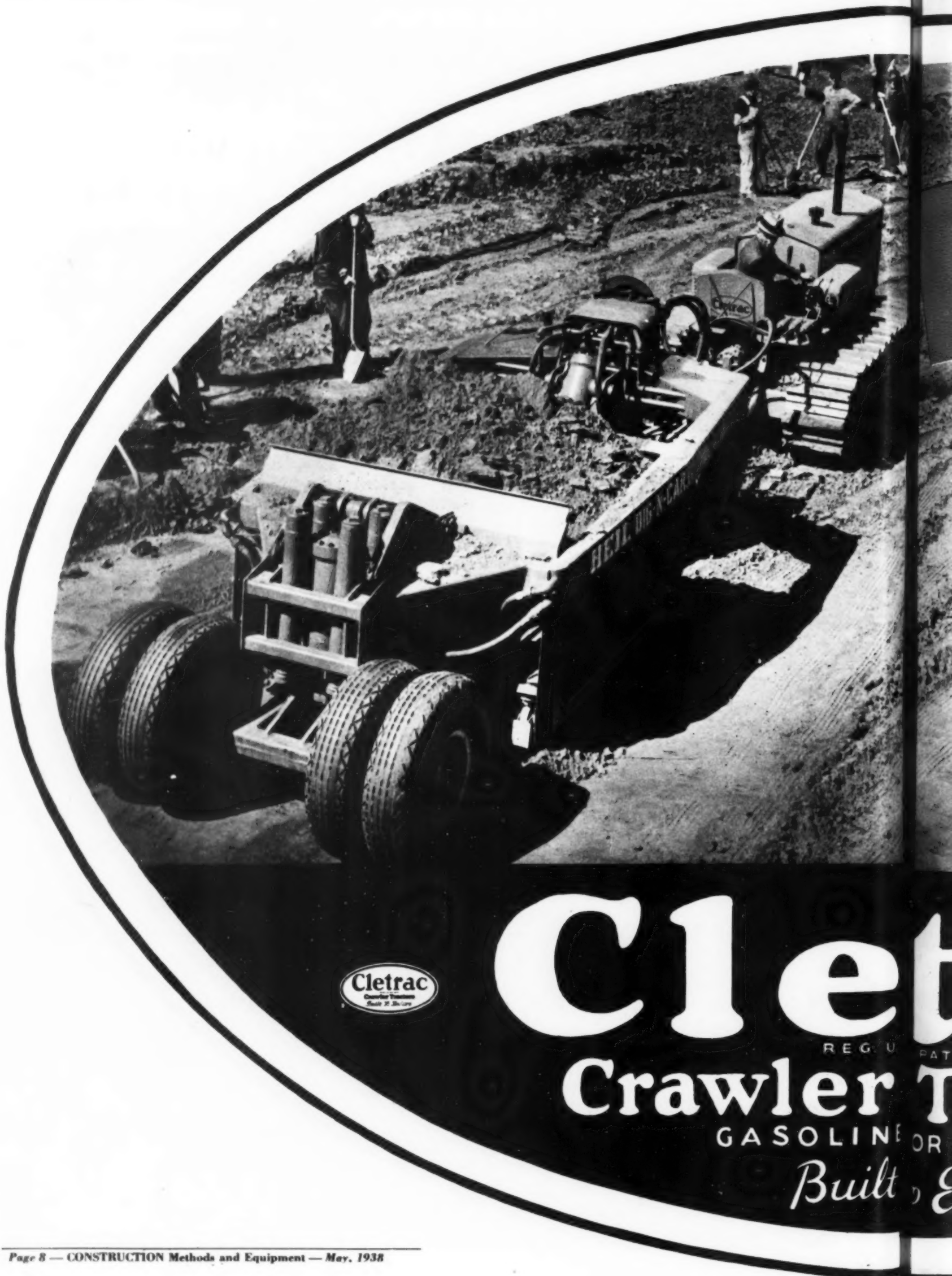
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Phenomenal performance is this on a big earth moving job at Lexington, North Carolina. No question about it...even to a Scotchman's economical heart.

But like this Model DDH Cletrac Diesel handling a Neil 6-yard scraper, all Cletracs are built to cut costs...to give you lavish performance at a miser's cost.

Cletrac Diesels, and the larger gasoline models, with their electric starting, are on the job faster in the morning. Should they stall, and what tractor won't, they're on their way again at a touch of the button. No delays. No getting down off the tractor. No hand cranking.

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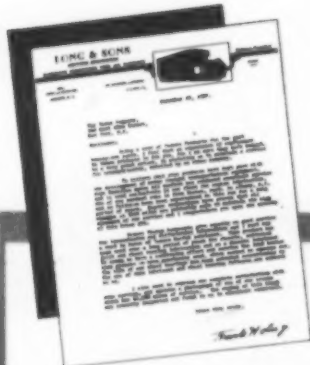
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OR DIESEL

# Endure

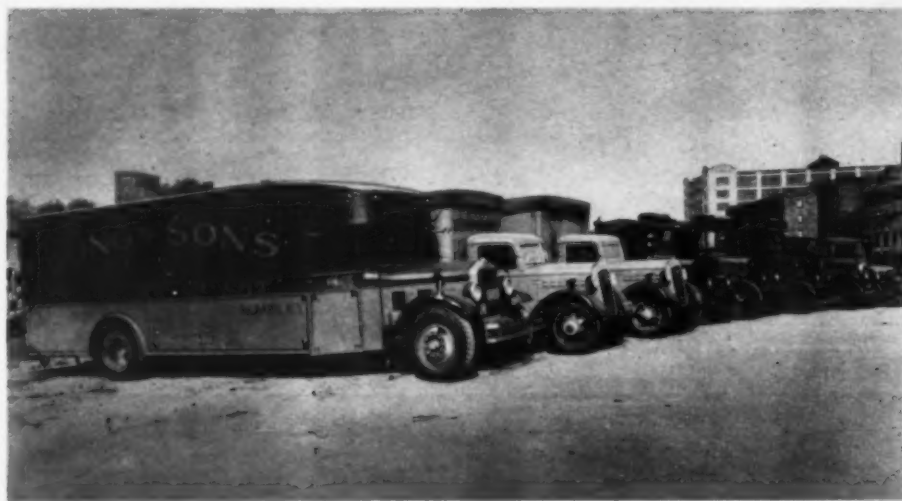


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The new Atlas Manasite Blasting Cap, however, gives the user of explosives a much greater margin of safety than is possible with any detonating cap in common use.

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EXPLOSIVES



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● These three Lorain-40's of the Luck Construction Corp. are handling a 150,000-yd. drainage contract on the Front Royal, Va., project of the American Viscose Corporation.

Teamwork between the shovel, backdigger, and dragline is essential to the success of this operation as each is dependent upon the steady production of the other for a profitable day's work. And not one has shirked its responsibility, for each is averaging 600-yds. per 10-hour day for a grand daily total of 1800-yds.

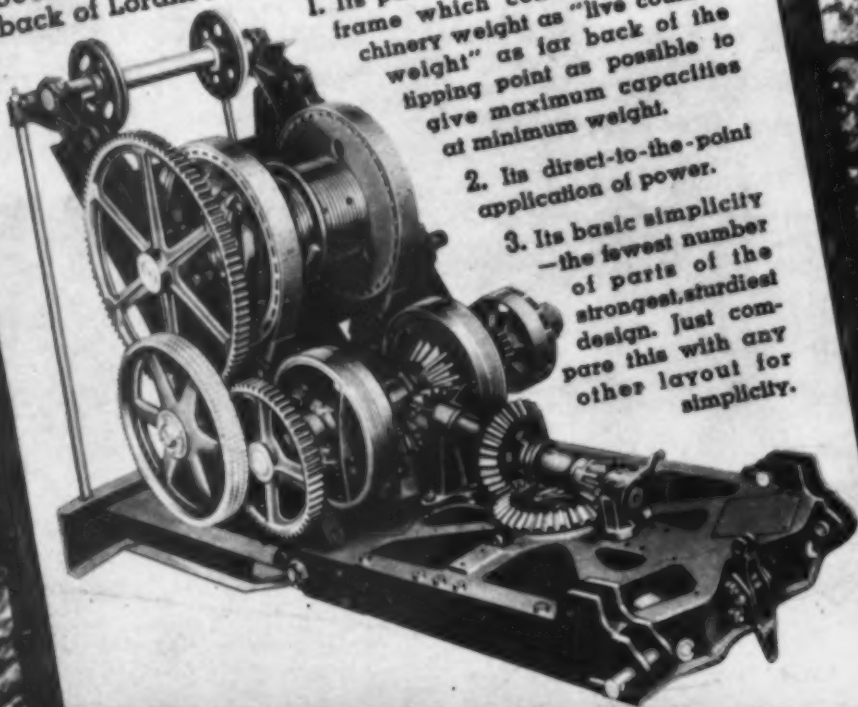
Performance such as this gives proof to the Lorain-40's versatility. Regardless of the boom equipment used, the Lorain-40 utilizes but one simplified turntable of Center Drive design which incorporates all essential mechanical requirements for dependable, low-cost operation.

Write for catalog containing complete construction and performance data.

UNIVERSAL CRANE DIVISION • THE THEW SHOVEL CO.  
LORAIN, OHIO

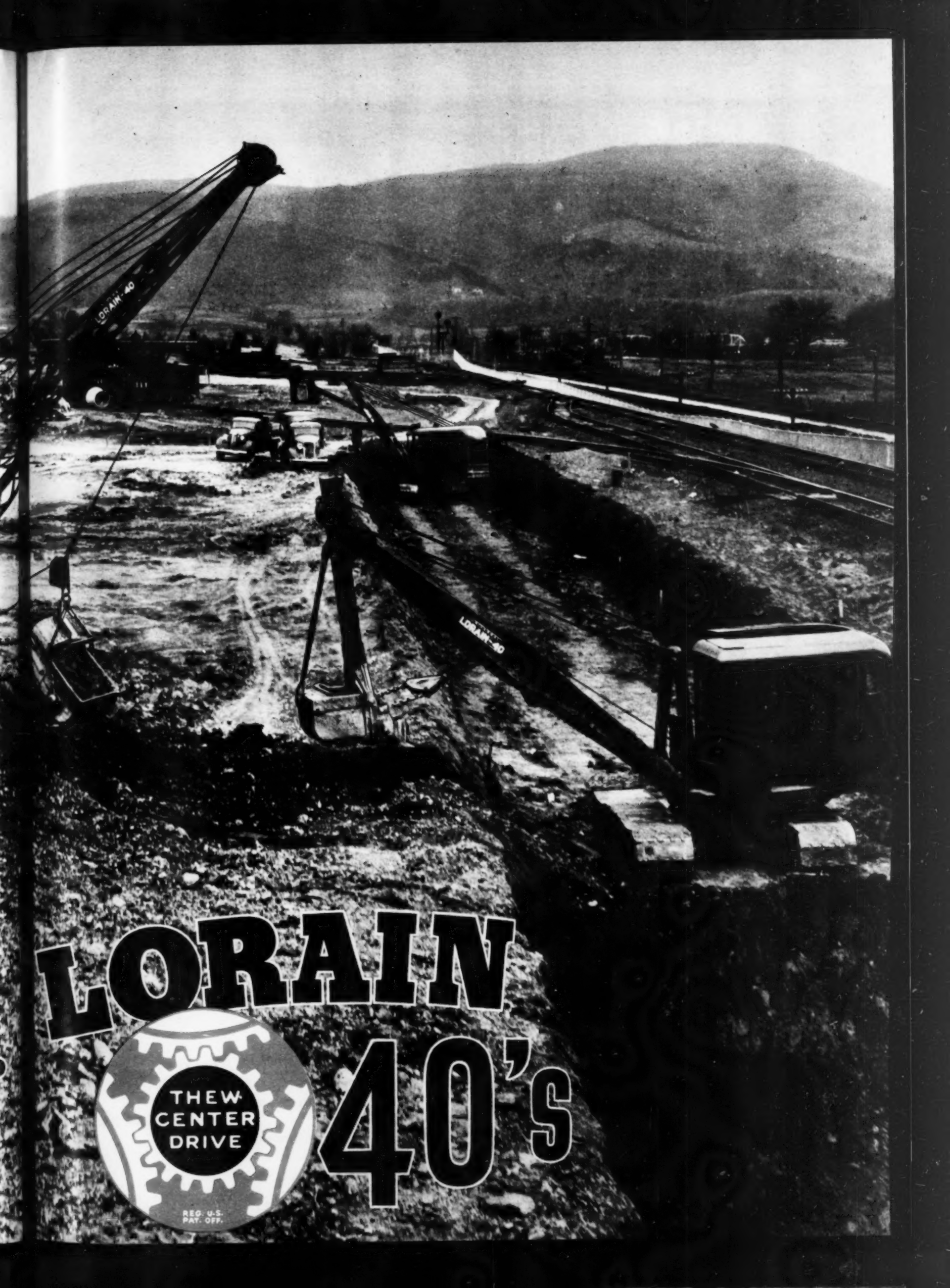
In this view the front struts and operating gear have been removed to show plainly 3 of the reasons back of Lorain's outstanding performance—

1. Its patented sloping machinery frame which concentrates machinery weight as "live counterweight" as far back of the tipping point as possible to give maximum capacities at minimum weight.
2. Its direct-to-the-point application of power.
3. Its basic simplicity—the fewest number of parts of the strongest, sturdiest design. Just compare this with any other layout for simplicity.



## 3/4 YD.





# LORAIN 40's



# BLAW-KNOX Self-Aligning ROAD FORMS

The ordinary road form is forced off plumb when the stake hits a stone, because the hole in top of stake pocket has only 1/16" clearance for stake.

The ordinary road form is "tipped" off plumb and line as result of a bent stake, because hole in top of stake pocket has only 1/16" clearance for stake.

Blaw-Knox Self-Aligning Road Form is undisturbed when stake hits a stone. Elongated hole in stake pocket provides liberal clearance—form stays true to line and grade.

Blaw-Knox Self-Aligning Road Form is undisturbed by bent stakes. Elongated hole in stake pocket provides liberal clearance—forms stays true to line and grade.

★ Blaw-Knox Self-Aligning Road Forms are the best buy for any contractor, because—

*Easier and Quicker Form Setting*—Inexperienced help can quickly learn how to set Blaw-Knox Self-Aligning Road Forms accurately and rapidly, because alignment of the forms is not disturbed by bent stakes or stakes hitting obstructions.

*More Positive Staking System*—Double wedge insures stronger engagement of form and stakes.

*Eliminate Delays at Paving Mixer*—Re-alignment of forms disturbed by trucks or other equipment quickly accomplished by simple manipulation of the wedges.

*Forms are Stronger and More Durable*—Buttressed and reinforced to take the shocks of modern paving operations and to distribute loads over the entire form base.

Send for Blaw-Knox Catalog No. 1557—and prices.

**BLAW-KNOX DIVISION**  
OF BLAW-KNOX COMPANY

2086 FARMER'S BANK BUILDING

PITTSBURGH, PA.

Offices and Representatives in Principal Cities



# LOW MAINTENANCE

## *demonstrated*



● After 2000 hours of continuous operation, the heads and pans of the Model HIP-6 Cummins Diesel which powers this crane were pulled for inspection. Total replacement parts, including a complete set of gaskets, cost less than \$20.00. That's why we say powered by a Cummins Diesel means "Powered for Profit." Cummins Engine Company, 1707 Wilson Street, Columbus, Indiana.

**CUMMINS**  
*Dependable*  
**DIESEL**

PIONEER IN MODERN DIESEL DEVELOPMENT

"THERE'S A REAL

*Quality Story*

BEHIND THESE  
**GULF OILS!"**



*Here is one of the machines Gulf's technical men have devised for testing lubricating oils. The oil, mixed with water, is circulated rapidly through the machine while a stream of oxygen is whipped thoroughly into it. Many oils have been tested with this instrument but none have shown stability equal to Gulf's higher quality oils.*

GOOD CRUDES, refined by modern methods, make fine lubricating oils—oils that prove their quality in industry's machines. Performance in actual service is the real test of any product, including oils and greases.

Yet Gulf research engineers have not been content with the usual service tests for Gulf's higher quality lubricants. They have devised laboratory instruments which punish oils far more severely than any machine in industry... instruments that find ways to make oils oxidize and break down. As a result of these tests, Gulf engineers then develop oils with such characteristics that they can stand far greater punishment than they will ever receive in normal service. Thus users are assured of oils that possess a "margin of safety" well beyond average requirements.

There's a real quality story behind Gulf oils and greases. Let a Gulf engineer demonstrate to you—on the job—how

Gulf's higher quality lubricants provide a greater measure of protection for your equipment—and help you reduce maintenance and repair expense.

**GULF OIL CORP. • GULF REFINING CO.**

GENERAL OFFICES, PITTSBURGH, PA.



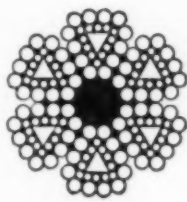


# Toughness

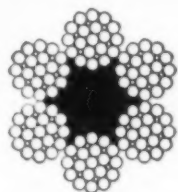
plus  
STRENGTH  
ELASTICITY  
FLEXIBILITY  
DURABILITY



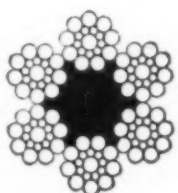
## All Perfectly BALANCED



Style B  
Flattened Strand



6x19  
Filler Wire



6x19  
Seal

A heavy duty wire rope must be tough enough to take plenty of punishment . . . round after round and still come back for more.

All "HERCULES" (Red-Strand) Wire Rope is tough . . . as tough as wire rope can be made without sacrificing those other equally vital factors of strength . . . elasticity . . . flexibility and durability. It is the balance of these characteristics that enables "HERCULES" to win the decision for you in your battle to reduce operating costs.

For best performance and real economy you need this balanced wire rope. Specify it for your next job.

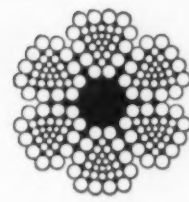
*In order to be suitable for all conditions, "HERCULES" (Red Strand) Wire Rope is made in a wide range of both Round Strand and Flattened Strand constructions—all of which can be furnished either Standard or Preformed.*

Made Only By A. Leschen & Sons Rope Co. Established 1857

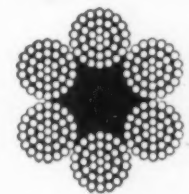
5909 Kennerly Avenue, St. Louis, Mo.

New York . . . . . 90 West Street  
Chicago . . . . . 810 W. Wash. Blvd.  
Denver . . . . . 1554 Wazee Street

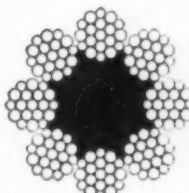
San Francisco . . . . 520 Fourth Street  
Portland . . . . . 914 N. W. 14th Ave.  
Seattle . . . . . 2244 First Avenue South



"G"  
Flattened Strand



6-37  
Extra Flexible



8x19  
Extra Flexible

LEADING EQUIPMENT AND  
MACHINERY MANUFACTURERS  
POWER THEIR PRODUCTS WITH



# CATERPILLAR DIESEL ENGINES

IT WILL PAY YOU TO ASK FOR "CATERPILLAR" DIESEL POWER IN THE EQUIPMENT YOU BUY . . .  
NOT ALONE BECAUSE OF ITS THOROUGH DEPENDABILITY, BUT PARTICULARLY BECAUSE OF THESE

## 6 POINTS OF ECONOMY

1. "Caterpillar" Diesel Engines use inexpensive commercially available fuel — and very little of it, at that. As compared with gasoline engines, they use, approximately, only half the quantity of fuel at about half the price per gallon.

2. "Caterpillar" Diesel Engines need less time out for maintenance. They are simple in operation, require very little attention, and demand fewer adjustments. (No ignition system to get out of adjustment with resulting decrease in horsepower.)

3. "Caterpillar" Diesel Engines give quick response to variable loads. No delay or wasted "pick-up" time when load is applied.

4. "Caterpillar" Diesel Engines have longer operating life. In a relatively short period these engines have built up operating records of 18,000 to 20,000 hours and over, at amazingly low maintenance expense, and are still going strong.

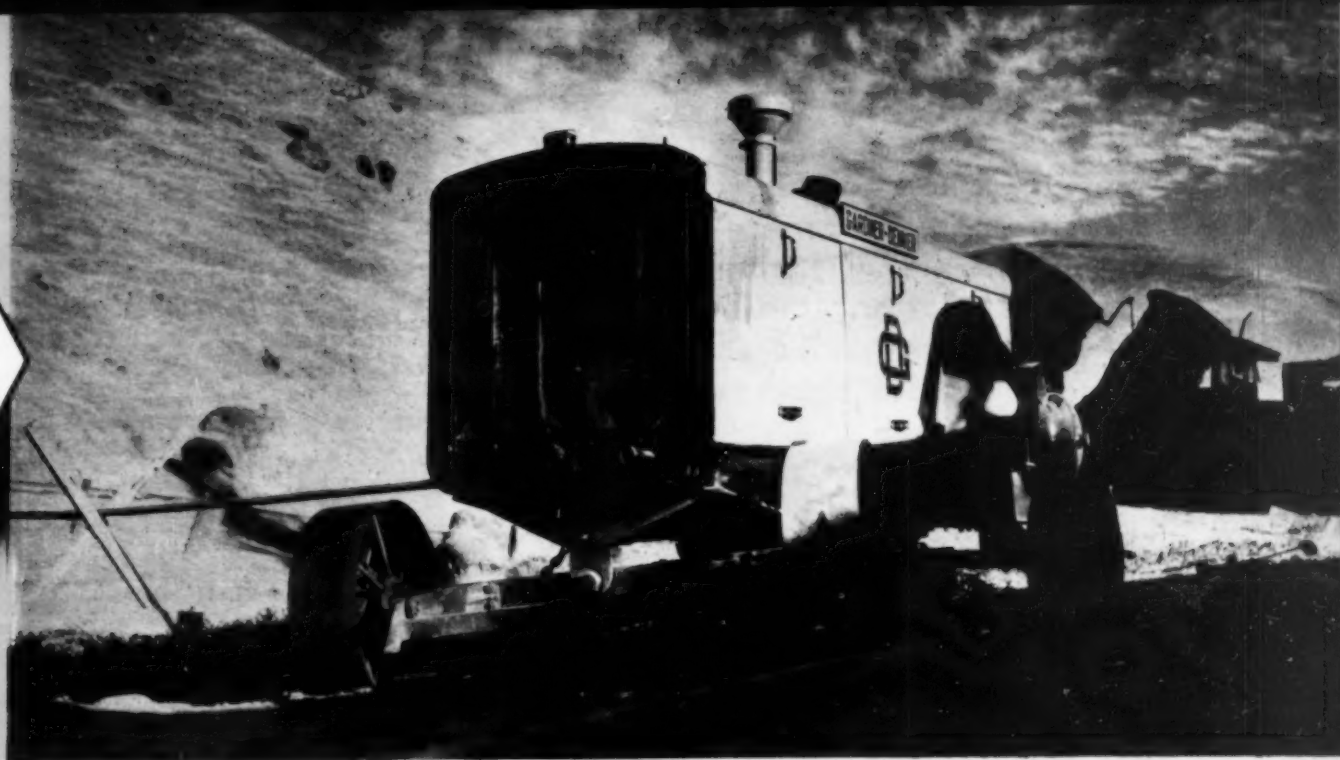
5. "Caterpillar" Diesel Engines assure dependable operation from short periods of light load to long periods of continuous duty — and on jobs from the hot jungles of Africa to the bitter-cold Arctic.

6. "Caterpillar" Diesel Engines are backed by the most complete organization of replacement parts and service facilities offered by any engine manufacturer.

NINE SIZES—32 TO 160 HP. • CATERPILLAR TRACTOR CO., PEORIA, ILL.



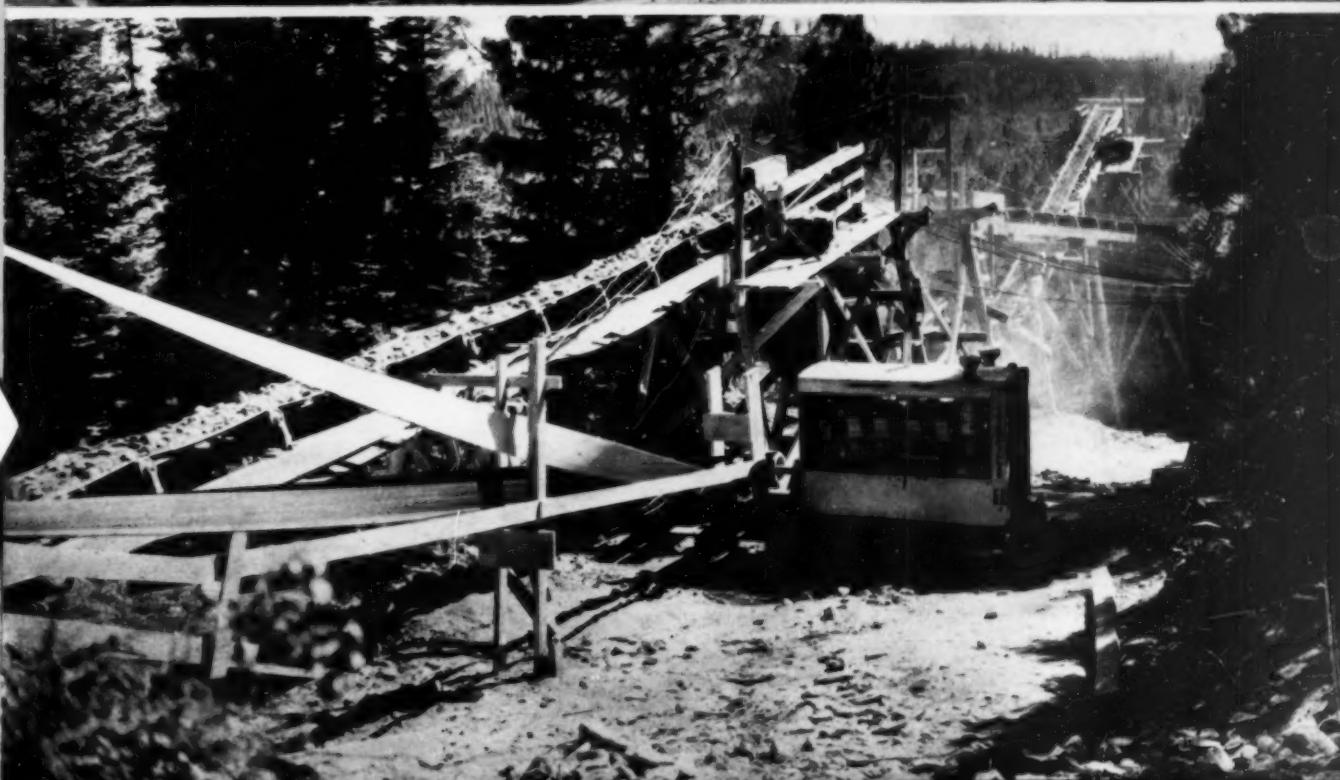
A "Caterpillar" Diesel Engine, of 125 horsepower, powering a Gardner-Denver compressor—in operation on the Altamont Pass "bottleneck removal." Consumes only 16¢ worth of fuel per hour. (The owners, Granfield, Farrar & Carlin, also operate a fleet of "Caterpillar" Diesel track-type Tractors.)



A "Caterpillar" Diesel-powered Bucyrus-Erie shovel on the Stevens Pass highway project over the Cascade Mountains... operating on 5 gallons of low-cost fuel per hour—keeping a string of trucks busy at an altitude of 3500 feet.



A "Caterpillar" Diesel Engine, of 125 horsepower, driving a Traylor rock crusher. Produces 100 to 150 tons of gravel per hour for 8-mile surfacing project. Saves \$11 a day compared to cost of former type of power. (Contractor also has a "Caterpillar" Diesel Tractor, a "Caterpillar" Diesel No. 10 Auto Patrol, and a Link-Belt shovel powered by a "Caterpillar" Diesel Engine.)



On the Lyons-Fulton Bridge, Lehigh Early Strength Cement was used for quick service concrete to eliminate costly traffic diversion. On highway work, or any other type of construction, its use often results in definite dollars and cents advantages. It makes concrete that reaches service strength in 24 to 48 hours. This quick use of completed concrete shortens construction time. Job overhead is reduced. Labor and equipment are quickly released for use elsewhere. Fewer forms are needed because of quick re-use. In cold weather, heat-curing costs are minimum. Lehigh Early Strength also facilitates obtaining concrete of maximum density and fine surface appearance. Investigate the advantages of Lehigh Early Strength Cement for all concrete work—if not for the entire job, then for key portions, where quick completion may aid in expediting the entire project. Send for general informative literature or for data applying to any specific project.

## LEHIGH PORTLAND CEMENT COMPANY

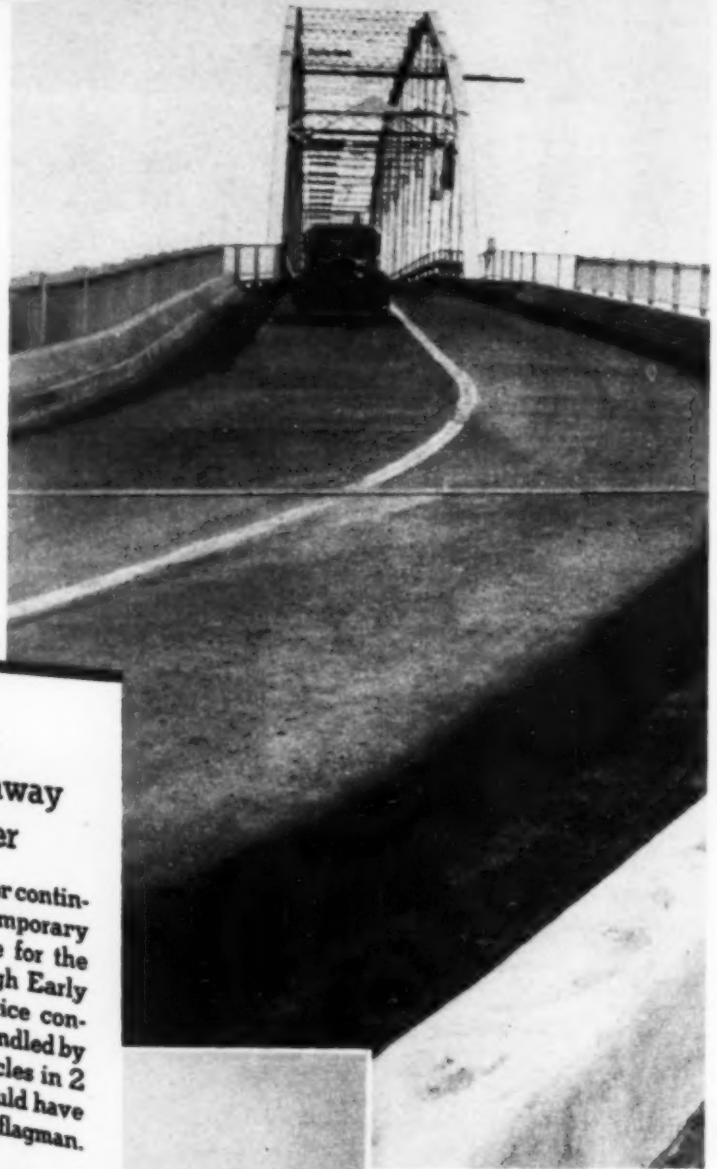
Allentown, Pa. Chicago, Ill. Spokane, Wash.



### Traffic Maintained During Reconstruction of Lincoln Highway Bridge over Mississippi River

It was imperative that traffic be maintained for continuous toll revenue. For most of the bridge a temporary roadway was provided. This was impossible for the last span. For this section of pavement, Lehigh Early Strength Cement was used to get quick service concrete. Built half at a time, one-way traffic was handled by a flagman. Each new section was open to vehicles in 2 days. Slower curing normal portland cement would have prolonged both inconvenience and the expense of flagman.

# Quick Service Concrete STOPS costly traffic diversion



Lyons-Fulton Bridge  
over Mississippi River  
Clinton, Iowa

Engineer:  
Howard Green Engineering Co.

Contractor:  
Clinton Engineering Co.



**More "RPM" Diesel Engine Lubricating Oil  
is being sold and used in "Caterpillar" Diesel  
Engines than all other Diesel oils combined**



"RPM" Diesel Engine Lubricating Oil is distributed  
by the following companies under the brand names  
indicated:

**IN THE UNITED STATES**

**"RPM" Diesel Engine Lubricating Oil:**

THE CALIFORNIA COMPANY (Montana only)  
THE CARTER OIL COMPANY, Tulsa, Oklahoma  
HUMBLE OIL & REFINING COMPANY  
STANDARD OIL COMPANY (Indiana)  
STANDARD OIL COMPANY (Incorporated in Kentucky)  
STANDARD OIL COMPANY (Nebraska)  
STANDARD OIL COMPANY OF CALIFORNIA  
STANDARD OIL COMPANY OF TEXAS  
UTAH OIL REFINING COMPANY

**Diol "RPM" Diesel Engine Lubricating Oil:**

COLONIAL BEACON OIL COMPANY, INC.  
STANDARD OIL COMPANY OF LOUISIANA  
STANDARD OIL COMPANY OF NEW JERSEY  
STANDARD OIL COMPANY OF PENNSYLVANIA

**Signal "RPM" Diesel Engine Lubricating Oil:**

SIGNAL OIL COMPANY

**Sohio "RPM" Diesel Engine Lubricating Oil:**

THE STANDARD OIL COMPANY (Ohio)

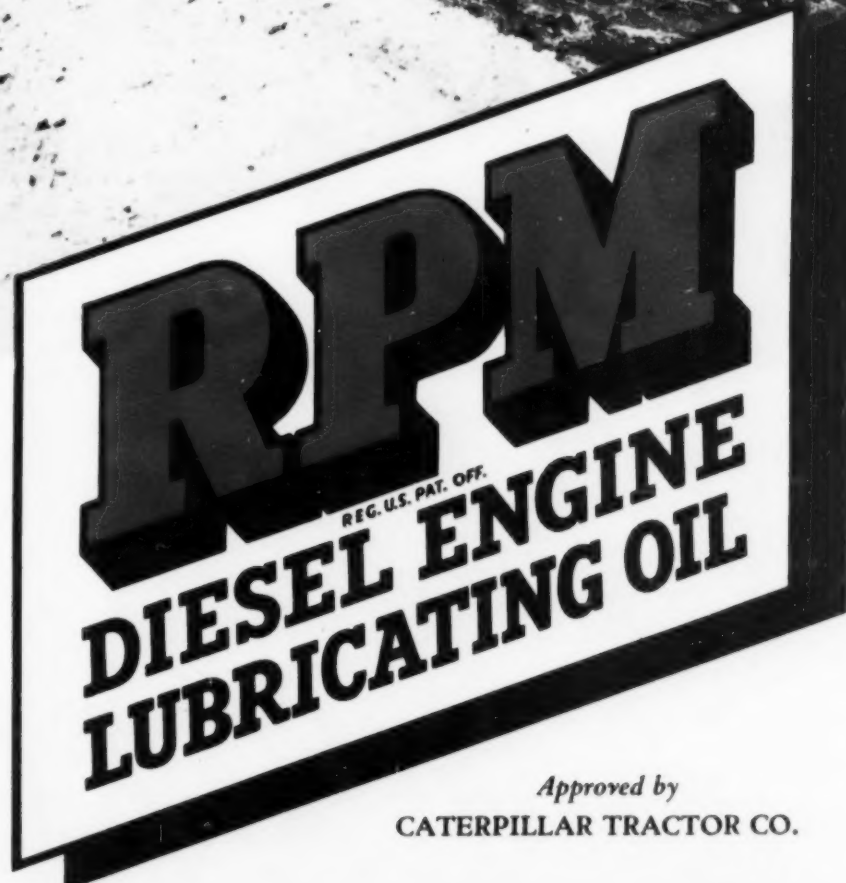
**IN CANADA**

**"RPM" Diesel Engine Lubricating Oil:**

IMPERIAL OIL LIMITED  
STANDARD OIL COMPANY OF BRITISH  
COLUMBIA LIMITED

**THROUGHOUT THE WORLD**

"RPM" Diesel Engine Lubricating Oil is also avail-  
able through distributors in more than 100 other  
countries.



Approved by  
CATERPILLAR TRACTOR CO.

**STANDARD OIL COMPANY OF CALIFORNIA**



# LAPLANT-CHOATE BULLDOZERS

Make More Money For You *Because they are Built Right!*



LaPlant-Choate Bulldozer at work on road construction job. Note that operator has safe, unobstructed view of work.

•  
LaPlant-Choate Bulldozer pushing out stumps on a land clearing job.



When you buy a LaPlant-Choate Bulldozer, your operator will do more work in less time. And here's the reason. Hydraulic control causes the Bulldozer to respond quickly and accurately to the desires of the operator. Hydraulic control is powerful and positive. The blade can be quickly placed in any desired position and rigidly locked in that position. The design of the blade provides maximum efficiency in the work of moving dirt, rocks, stumps, etc.

Thousands of LaPlant-Choate Bulldozers are right now being used by successful contractors who know that they can depend upon these units to do more work in less time. Don't wait until tomorrow. Call or write for full details TODAY! Your "Caterpillar" Dealer is ready to serve you.

**LAPLANT-CHOATE**  
MEANS  
**Lower Costs**

TAMPING ROLLERS  
SCRAPERS • TRAILBUILDERS

**LAPLANT-CHOATE**  
**MANUFACTURING CO. Inc.**  
CEDAR RAPIDS, IOWA.

RUBBER WHEELED WAGONS  
BRUSH CUTTERS • SNOW FLOWS



# EQUIPMENT HISTORY WRITTEN IN... FLOOD WATERS



Floods in California proved at least two things . . . about equipment: an emergency call to get rivers back in their channels . . . roads rebuilt . . . roads and streets reopened . . . showed that LeTourneau 'Dozers and Scrapers in service outnumbered all others combined more than 10 to 1. Second, that when real capacity for work under adverse conditions was essential, LeTourneau equipment could be depended upon to do the job quickly . . . without asking any favors.

Along one section of the Southern Pacific main line between Los Angeles and Bakersfield, five LeTourneau Bulldozers, repairing washouts, moved 60,000 cu. yds. in 5 days; then duplicated the performance on channel changes.

. . . At Tulare Lake, (inset) of 75 pieces of equipment called upon to throw up a levee, all but five pieces were LeTourneau . . . 40 Carryall Scrapers alone were represented . . . kept a step ahead of the lashing waters.

Your job may not be an emergency, but you can depend on LeTourneau to lower costs by producing more work with the same equipment investment . . . Savings start the day you see your "Caterpillar" dealer for a demonstration. Will you make it today?

## LETOURNEAU

R. G. LeTOURNEAU, INC., • Peoria, Illinois • Stockton, California • Cable Address: "Bobletorno"

Manufacturers of: Angledozer®, Buggies®, Bulldozers, Carryall® Scrapers, Cranes, Drag Scrapers, Power Control Units, Rooters®, Treedozer®.

\*Name Registered U. S. Patent Office.

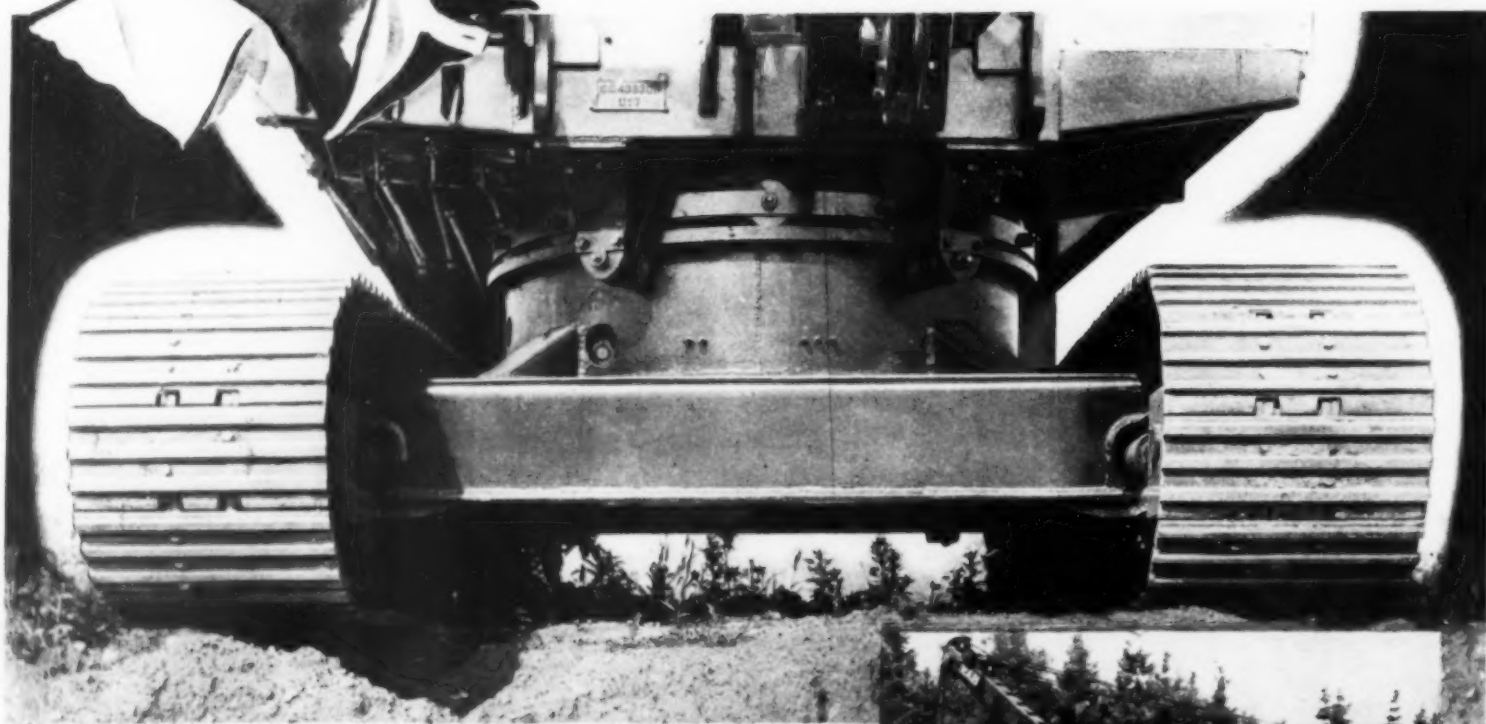


**YOU CAN'T  
HOLD BACK**

**PROGRESS**

**VERY LONG!**

**Welded Excavator Design is Here to Stay!**



● The excavator industry as a whole is quick to recognize each new advancement which leads to lower digging cost. For the past five years, P&H has been the only manufacturer building excavators of alloy rolled steels, all-welded. Today, others are beginning to adopt this more practical design... to meet the new standards of low-cost production which the P&H Pacemakers have set. Harnischfeger Corporation, 4404 W. National Avenue, Milwaukee, Wisconsin.



**17 DIFFERENT MODELS**  
ranging from 3/8 to 5 cu. yds.  
capacity with 7 attachment combinations.  
Gas, Diesel or electric power.  
Write for literature on the size  
and type you need.

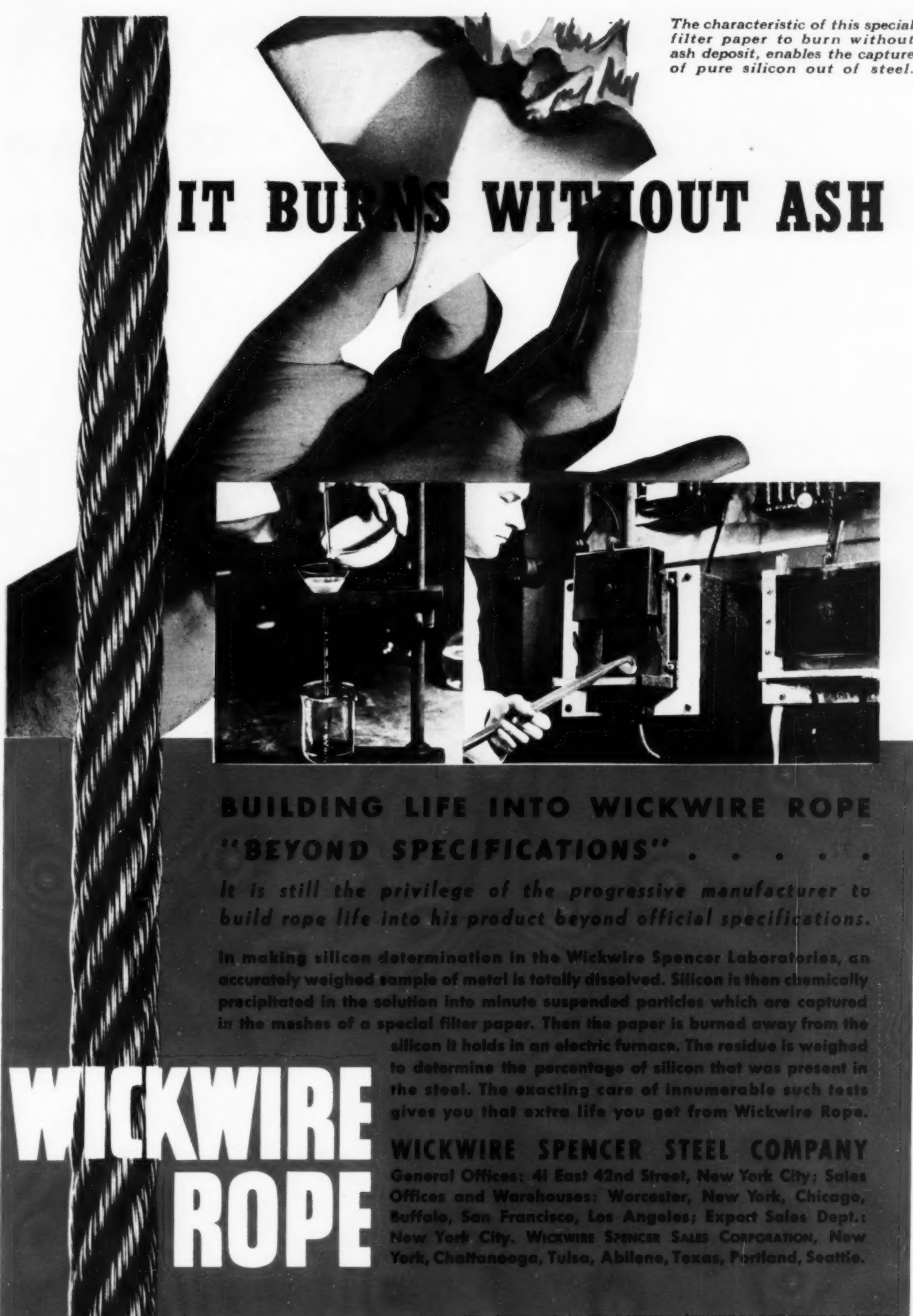
**HARNISCHFEGER**  
CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS



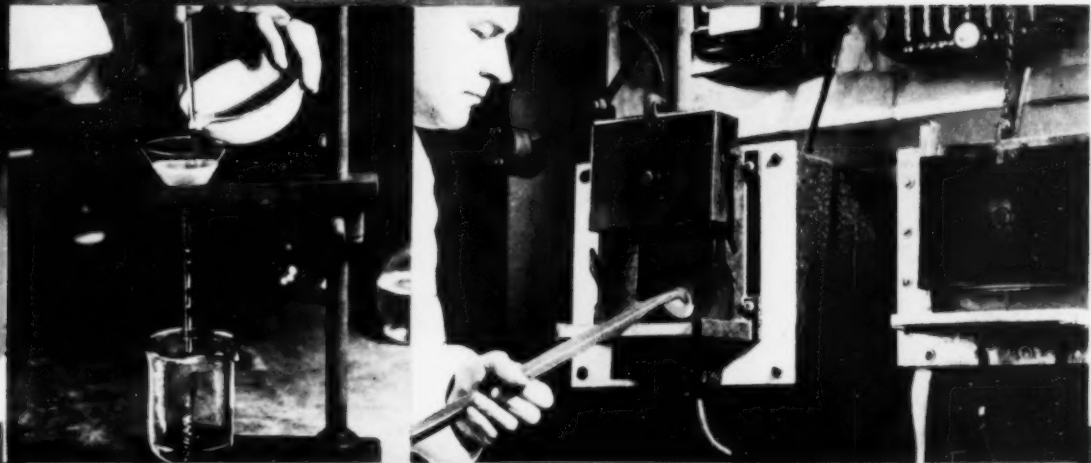
HOISTS • WELDING ELECTRODES • MOTORS





*The characteristic of this special filter paper to burn without ash deposit, enables the capture of pure silicon out of steel.*

## IT BURNS WITHOUT ASH



### BUILDING LIFE INTO WICKWIRE ROPE "BEYOND SPECIFICATIONS" . . . . .

*It is still the privilege of the progressive manufacturer to build rope life into his product beyond official specifications.*

In making silicon determination in the Wickwire Spencer Laboratories, an accurately weighed sample of metal is totally dissolved. Silicon is then chemically precipitated in the solution into minute suspended particles which are captured in the meshes of a special filter paper. Then the paper is burned away from the

silicon it holds in an electric furnace. The residue is weighed to determine the percentage of silicon that was present in the steel. The exacting care of innumerable such tests gives you that extra life you get from Wickwire Rope.

# WICKWIRE ROPE

#### WICKWIRE SPENCER STEEL COMPANY

General Offices: 41 East 42nd Street, New York City; Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles; Export Sales Dept.: New York City. WICKWIRE SPENCER SALES CORPORATION, New York, Chattanooga, Tulsa, Abilene, Texas, Portland, Seattle.

**36** TIMES A DAY • IT EQUALS  
ITS OWN WEIGHT IN YARDAGE!



and it's a lot of weight and a lot of yardage... in any language. Performances like this indicate why these Type 331- $\frac{3}{4}$  cubic yard excavators have acquired the same reputation for speedy, dependable service as have Marion's larger and more expensive machines. • There's a Marion of the right size and capacity for every material handling job. • •

Write for additional information regarding this "little" shovel. Its big performance records are 'way out of proportion to its size. • •

*The* **MARION**

**STEAM SHOVEL COMPANY • MARION, OHIO**



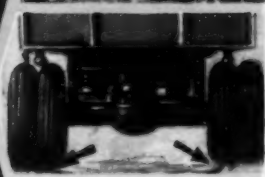
# YOU ESCAPE THESE HIDDEN HAULING COSTS

WITH  
**ATHEY FORGED-TRAK WAGONS & TRAILERS**

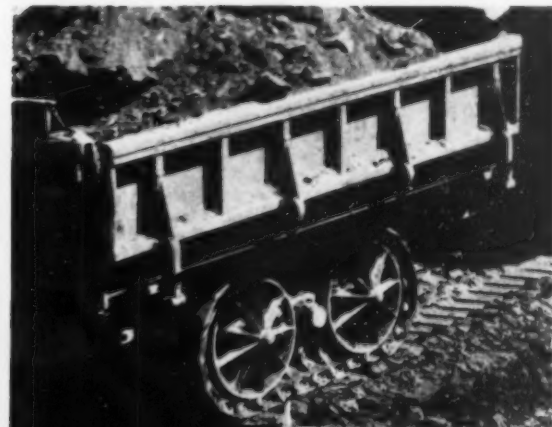
If you are looking for hauling equipment that will lessen your present hauling cost and overcome your hauling hazards, turn to Athey Forged-Trak Hauling Units pulled by "Caterpillar" Diesel Tractors. That's the *proved* way to speed up work and save money. See your "Caterpillar" Dealer or write us. **ATHEY TRUSS WHEEL CO.,** 5631 West 65th Street, Chicago, Illinois. Cable Address: "Trusswheel," Chicago.



**NO COSTLY  
LOADING  
STRAIN**



**"NO  
SHIFTING  
LOAD  
PENALTY"**



**NO  
SLIPPING**



Great weight dropped by the loader carries a tremendous impact to tires—results in high tire costs. Athey Forged-Trak Units *absorb* the overload caused by impacts of loading. Their double husky bodies, too, can "take it."

Uneven roadways result in shifting loads that cause early tire blow-outs and heavy replacement costs. With Athey Forged-Trak Units, steel wheels rolling over steel rails on a self-laying bed of steel, take care of road inequalities.

Slippage of round wheels on gravel, wet clay, loose stone, or slippery surfaces, or on bumpy, rutted or uneven haul roads means greater wear and tear on equipment and tires. The track-type principle of Athey Forged-Trak Dump Trailers reduces slippage to a minimum.



**NO  
WASHBOARD  
ROADS**



**NO  
MIRING**



**NO  
SPILL  
HAZARDS**



"Washboard" roads hammer the life out of heavily loaded rubber tires . . . set up vibration of the equipment that results in breakage and rapid deterioration. Washboard roads *do not* exist for Athey Forged-Trak Wheels.

Athey Forged-Trak Wheels—self-cleaning—have a solid, contact area far greater in weight-supporting ability than dual or any practicable multiplicity of round wheels. They do not slip, spin or dig ruts. Their broad tracks tamp the surface; build up the road base.

Excessive spill causes difficulty in moving the loaded truck from under the loader, and frequently necessitates cleaning up the spill. The husky, rigid frames and three-point spring suspension of Athey Units eliminate the hazards to hauling equipment under the loader.

**ATHEY FORGED-TRAK**

(REG. TRADE MARK)

# ATHEY

**WAGONS & TRAILERS**

# BITUMINOUS OR STABILIZED MIXING — CENTRAL OR TRAVEL PLANT



**T**HE BARBER-GREENE MIXER is not just for today's—or even this year's jobs. It is designed ingeniously to correctly proportion and mix bituminous and stabilized mixes of any specifications, operating either as a Travel or Central Plant.

The Barber-Greene Mixer is not restricted to any locality. Its high portability gives easy economic justification to as many new set-ups as the jobs require. In spite of its high portability and adaptability to new conditions, the Barber-Greene gives the most accurate control—and the lowest operating cost.

The *high capacity* of this machine means that some other part of your equipment will be the “neck of the bottle”—not the Mixer.

The owner of this Barber-Greene has made a sound investment. Changing conditions cannot lower its value. It will yield profits on every type of low cost road construction.

SEND FOR YOUR COPY

A new 16 page folder giving complete information on Central and Travel Plant operation, including Bituminous as well as Stabilized work, and with full information on the Barber-Greene Mixer is just out. Send for your copy. There is no obligation.

**BARBER-GREENE CO.**

530 W. Park Ave., Aurora, Ill.

Accurate  
Proportioning

Thorough  
Mixing

High Capacity

Automatic  
Operation

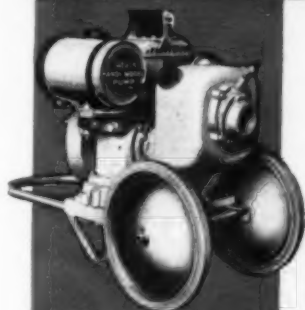
High  
Portability

Low  
Clearance

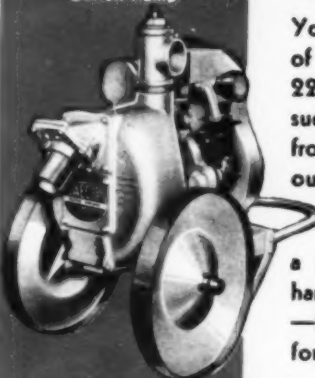
**BARBER  
GREENE**



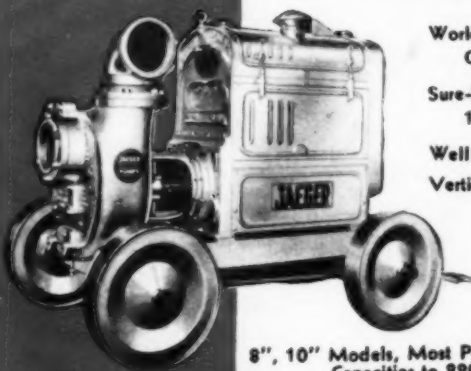
# Water Meets Its Master When You Use a JAEGER PUMP



Jaeger "Handy" — Lowest Priced 7000 Gallon Pump



Compact 2", 3", 4", 6" Models—10,000 to 90,000 G. P. H.



8", 10" Models, Most Portable of Big Pumps — Capacities to 220,000 G. P. H.

## Faster Priming + High Efficiency + Longer Service = LOWEST COST per GALLON

Contractors put more faith and money into Jaeger Sure Prime Pumps than any other make. They'll tell you it's because no other pump KNOWS HOW TO HANDLE WATER like a Jaeger.

You can prime and pump a tiny trickle of air and water or a roaring flood of 220,000 gallons an hour. You can suck dry the wettest sand, lift water from the deepest hole, jet it or force it out through miles of pipe. On any job where water is a problem, give it to a Jaeger Sure Prime. You'll have a pump that will prime faster, pump harder, work thousands of hours longer—for less money than you've ever paid for pumping.

THE JAEGER MACHINE CO.  
800 Dublin Ave. Columbus, Ohio

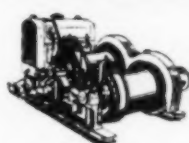
World's Largest Manufacturer of Contractors' Pumps

Sure-Prime Centrifugals — 2" to 10" Sizes, Gas, Electric

Well Point Systems

Vertical Caisson Pumps

Dual Duty Jetting—  
Dewatering Pumps  
Diaphragm Pumps,  
Triplex Road Pumps



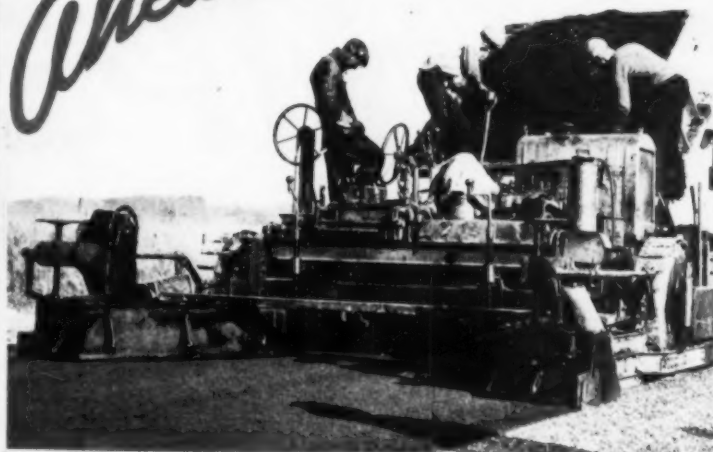
HOISTS  
from 10 to  
100 H. P.



MIXERS  
Tilting, Non-  
Tilt, 3 1/4 S to  
56 S Sizes



# Ahead on All Three!



- **CAPACITY** (Lays Material Faster than Most Plants Can Mix It)
- **ADAPTABILITY** (Lays Stone, Macadam, Hot or Cold Mixes—Widths to 14 Ft.)
- **SMOOTHNESS** (Equivalent to Form Job)

Capacity exceeds 100 tons an hour on many jobs. Long equalizing runners act as movable forms. Weight and traction are confined to hard subgrade. Lays wide widths, blends joints, paves flush to curb or header—cuts costs, does better job. Send for Catalog.

THE JAEGER MACHINE CO., 800 Dublin Ave., Columbus, Ohio  
World's Largest Builder of Spreading and Finishing Machines

## JAEGER *Bituminous* PAVER



# SPEED KING

## JAEGER'S 105 BRIDGE BUILDER

fastest selling, fastest performing mixer—on the road, on the job!

Trails at 35 m.p.h. on two pneumatic tires; Timken bearings—loads and discharges faster, even with stiffest concrete—and discharge cuts cost of placement in the forms. Also built in 75 size. Get new Catalog and prices.

The JAEGER MACHINE CO.  
800 Dublin Avenue  
Columbus, Ohio



OTHER SIZES TYPES  
3 1/4 S to 56 S

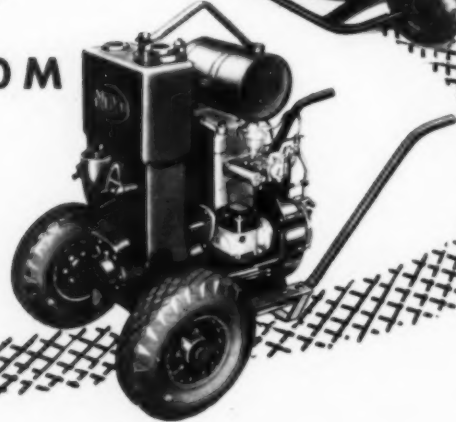


# PUMPS

15 & 20 M



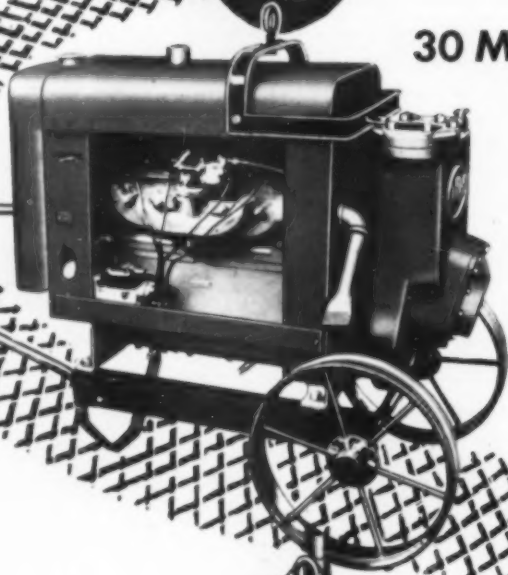
7 & 10 M



5 M



30 M



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# Construction

## Methods and Equipment

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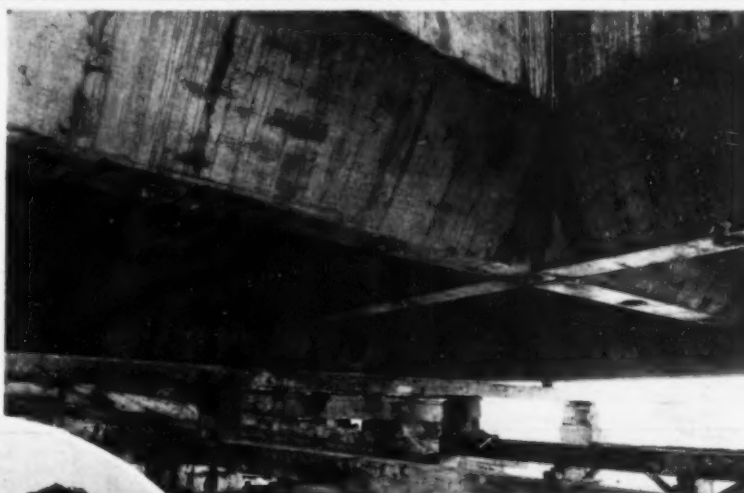
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**ALL-WELDED STEEL CAISSON** for Queens tower pier of Bronx-Whitestone bridge is assembled in shipyard at Wilmington, Del., from sections fabricated at Pittsburgh.



**CUTTING EDGE** of floating caisson has welded outlets of 8-in. pipes to be used in jetting caisson to rock.



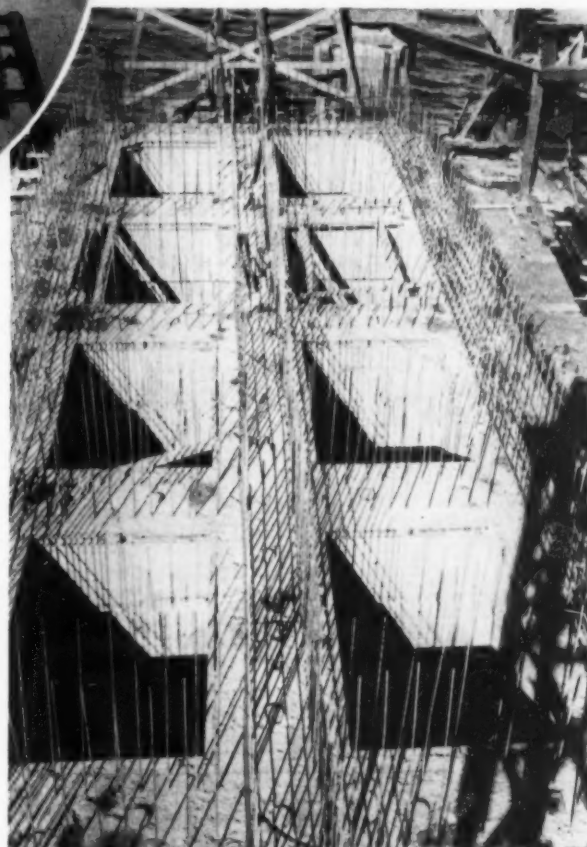
**LAUNCHED FROM WAYS** (in circle, left) floating caisson is ready to be towed to site in East River, New York City.

## All-Welded Floating Caissons Towed 200 Miles To Bronx-Whitestone Bridge

**T**WO FLOATING all-welded steel caissons 38 ft. square, with rounded corners, for the Queens tower piers of the Bronx-Whitestone bridge, New York City, were assembled to a height of 21 ft. at the Wilmington, Del., yard of the Dravo Corp., Pittsburgh, Pa., and were towed to the site in the East River for sinking by the Frederick Snare Corp., New York City, foundation contractor, under the direction of Madigan-Hyland, engineers for the Triborough Bridge Authority. The caissons were sunk by jetting through 8-in. pipes, welded box sections being added in 10½-ft. lifts up to a total height of 110 ft. 3 in. Concrete was placed in successive lifts as the steel sections were added. Above the steel sections,

the concrete walls were raised by use of steel forms until the caissons landed on rock at average El. -143.

Welded steel cutting edges fabricated in sections at Pittsburgh and shipped by rail and lighter to the site also were used for six land caissons, two for the Bronx tower piers and four for the Queens anchorage foundations. These caissons are built up above the cutting edges with concrete placed in steel forms. The two front caissons of the Queens anchorage, 100 ft. long by 33 ft. wide, go to the greatest depth, El. -163. Rear caissons of the anchorage are circular, 24 ft. in diameter, and rest on rock at El. -155. Bronx pier caissons were the first to be landed, reaching rock at El. -89.



**LARGE RECTANGULAR CAISSON** for Queens anchorage is built up in 10-ft. reinforced-concrete lifts as sinking progresses.

# This Month's "NEWS REEL"

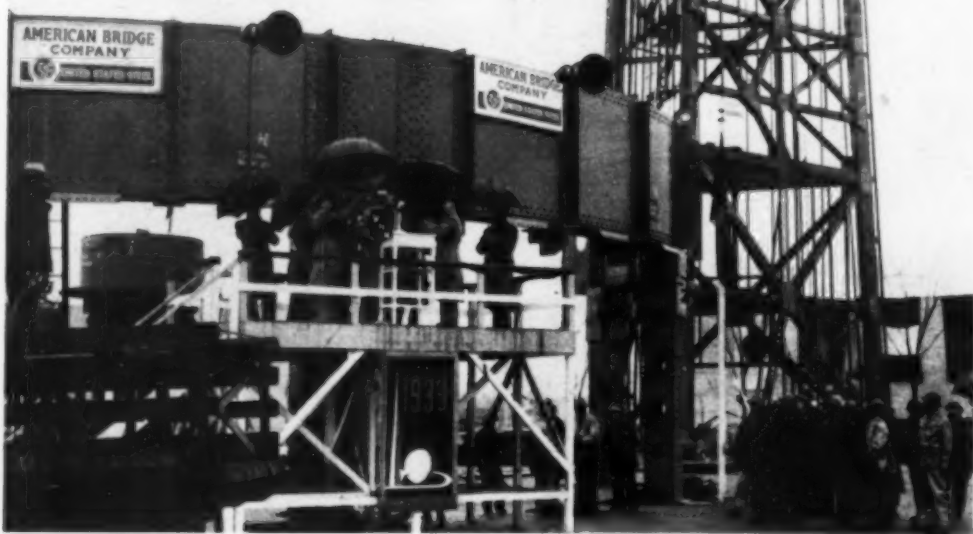


**BRONX-WHITESTONE BRIDGE.** New York City takes another step forward as American Bridge Co. completes erection of Bronx tower to full height of 380 ft. above East River. In foreground, Corbetta Construction Co. rushes placement of 30,000 cu. yd. of concrete in Bronx anchorage, while on far side of river Frederick Snare Corp. sinks caisson foundations for Queens tower and anchorage. Triborough Bridge Authority plans to open bridge by June, 1939, for World's Fair traffic. Structure will have main cable suspension span of 2,300 ft., side spans of 735 ft. and 135 ft. clearance above high water.

**FIRST ALL-WELDED STEEL FRAME** (below) complying with New York City's new Building Code is erected at 7th Ave. and 20th St. by Lehigh Construction Co. Connections for 14-story Kensington apartment, designed by Gilbert D. Fish, consulting engineer, are made by electric-arc process served by Wilson welding generators. Low voltage, 25-35 volts, is employed with current of 150-200 amp.



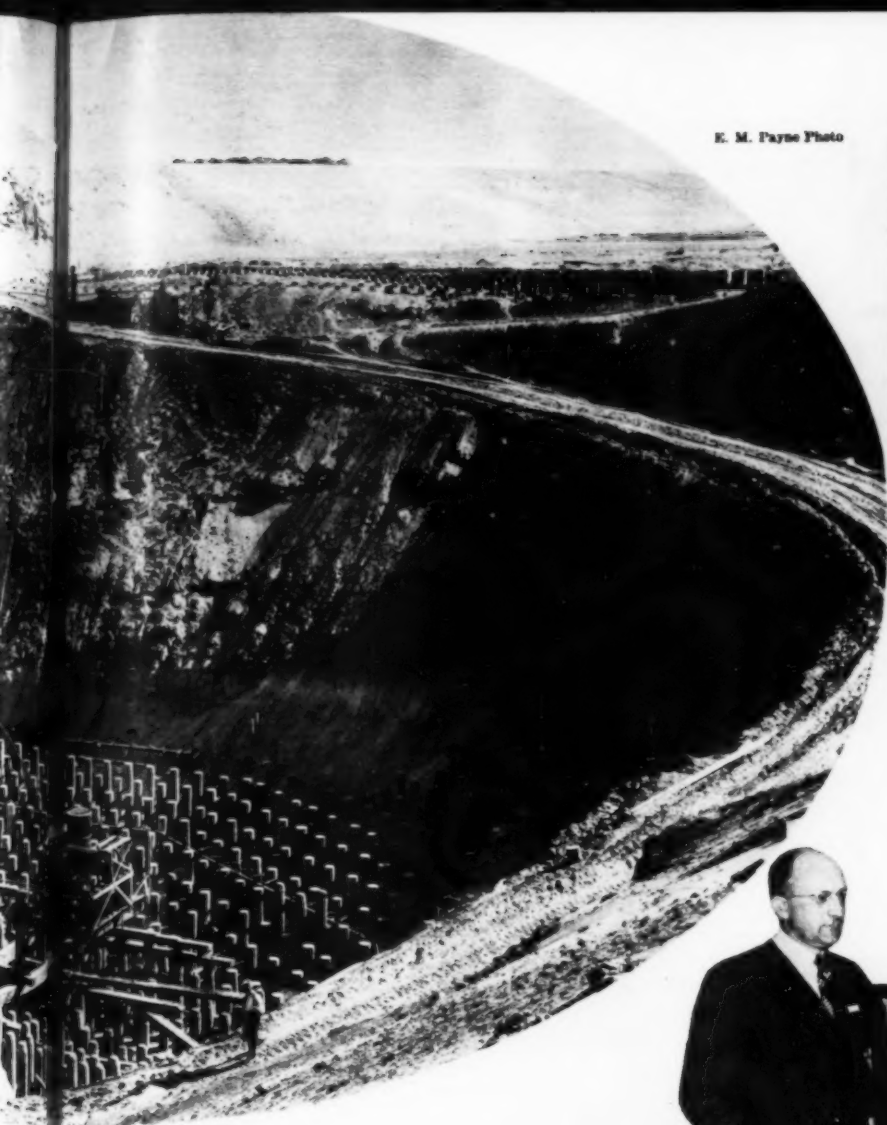
**PILES A PLENTY** are required to support the foundation of this power drop, one of three being constructed by U. S. Bureau of Reclamation to utilize to fullest water which will



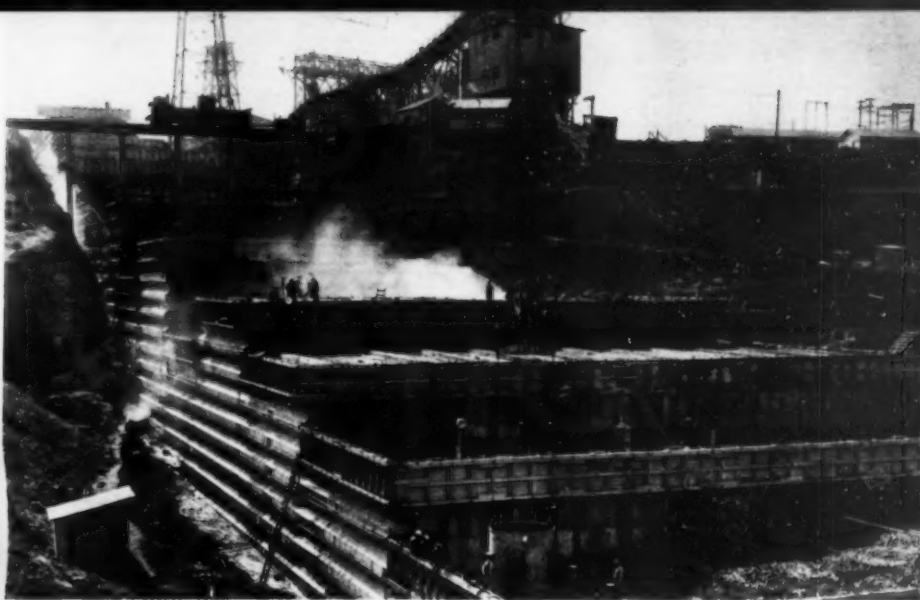
**PERISPHERE AND TRYLON.** "theme structures" of New York World's Fair of 1939, begin to take form on Flushing Meadow site, Long Island. Perisphere will be 200-ft.-diameter globe, while three-sided trylon, companion structure, will be slender, vertical shaft, 700 ft. tall. **CEREMONIAL FIRST RIVET** (inset, above) is driven for Perisphere by Edward R. Stettinius, Jr., 37-yr.-old chairman of U. S. Steel Corp., while Myron C. Taylor, former U. S. Steel chairman, Grover A. Whelan, president of Fair Corporation and L. A. Paddock, president of American Bridge Co., contractor for superstructure, look on.



E. M. Payne Photo



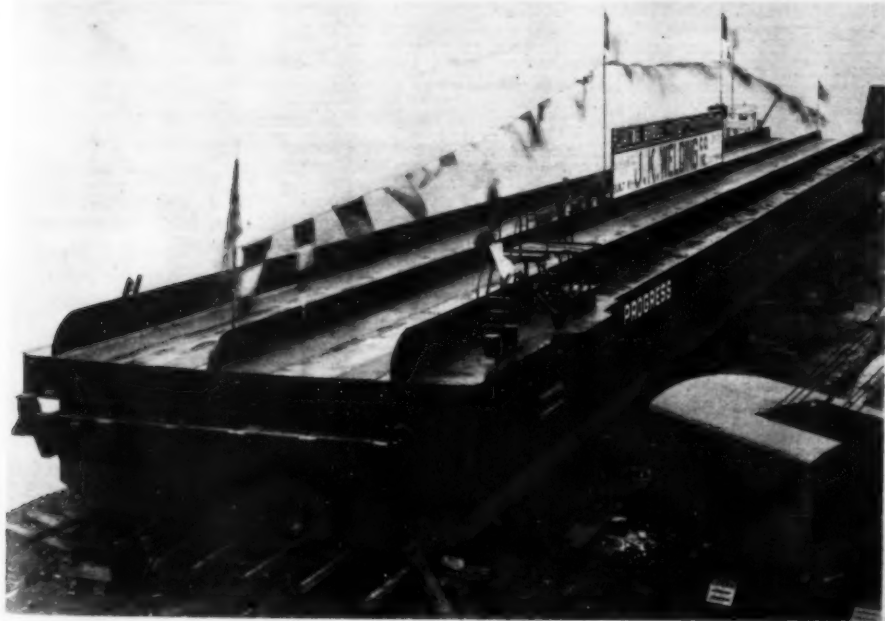
flow through 80-mi. All-American Canal in California. Located in desert 52 mi. below Imperial dam, substructure of power house will rest on 50-ft. bearing piles, driven into sand.



**MARSHALL FORD DAM.** \$5,781,235 U. S. Bureau of Reclamation project on Colorado River near Austin, Tex., rises in blocks which will require about 1,000,000 cu. yd. of concrete in completed structure. Contractors, Brown & Root, Inc., and McKenzie Construction Co., use 20-ton, 2,000-ft. span cableway to deliver concrete from mixing plant equipped with four 2-yd. tilting mixers served with aggregate by 1.5-mi. aerial tramway.



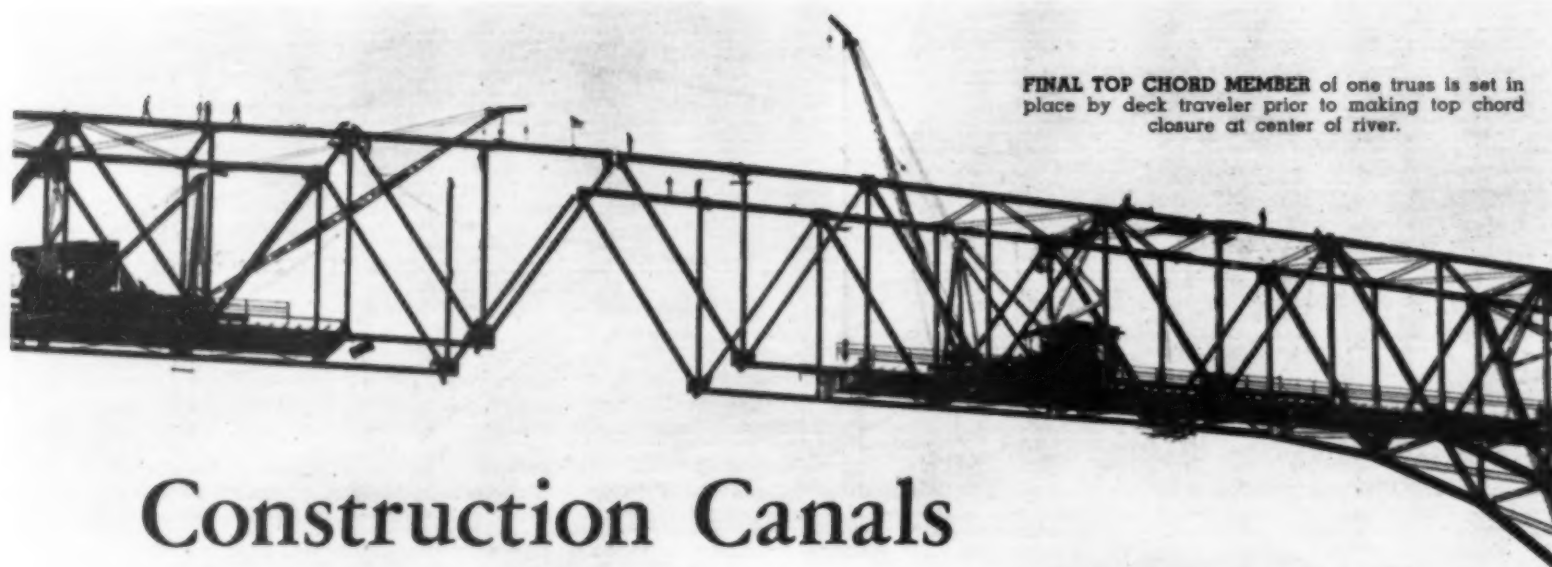
**ACCIDENT PREVENTION AWARDS** are made by Associated General Contractors of America at annual convention. (Left to right) President W. A. Klinger; C. H. Newell, of Texas Chapter, receiving Zachry trophy for James Spencer & Sons; C. Vappi, of Vappi & MacDonald, of Cambridge, Mass., winner of Shackelford trophy; F. L. Shackelford, donor of builders' trophy; L. S. Oakes of Winston Bros. Co., Minneapolis, winner of Swenson trophy; O. W. Swenson, of Foley Bros., donor of heavy construction trophy.



**FLOATING SWING SPAN** of all-steel welded construction, fabricated in 50 days on launching ways of J. K. Welding Co., in Brooklyn, will serve as connecting link in steel trestle between Rikers Island and North Beach Airport to allow WPA to truck 9,000,000 cu.yd. of fill from island to increase airport area, near New York World's Fair site, from 215 to 430 acres. Floating span 240 ft. long, weighing 300 tons, is launched broadside into bay and is towed up East River to position in 2,250-ft. trestle. Entire structure will be in service about 18 months and will then be dismantled and salvaged. New York City Dock Department built span for about \$60,000 under direction of WPA.

**FIRST CONCRETE (below)** is poured in Seminole dam, principal structure of Kendrick (formerly Casper-Alcova) project being built by U. S. Bureau of Reclamation on North Platte River, Wyoming, 70 mi. southwest of Casper. Arch concrete structure 270 ft. in maximum height, bid in at price of \$2,819,459, is being built by group composed of Morrison-Knudsen Co., Utah Construction Co., Winston Bros. Co. and Lawler Corp. For Reclamation Bureau H. W. Bashore is in charge as construction engineer.





FINAL TOP CHORD MEMBER of one truss is set in place by deck traveler prior to making top chord closure at center of river.

# Construction Canals

## Serve Builders of

### Neches River

### Bridge



**F**LAT MARSHLAND of low bearing value and potential winds of hurricane intensity governed the procedure adopted by foundation builders and steel erectors on the Neches River bridge, Port Arthur, Tex., destined this month to start carrying traffic on a new link in Texas' Hug-the-Coast highway. Long approaches rising on 5 per cent grade from the level marshes on both sides of the river to a 680-ft. main cantilever span affording 176-ft. vertical clearance for shipping extend the structure to an overall length of 7,815 ft. By dredging canals parallel with the approaches on both sides of the river, the Union Bridge & Construction Co., Kansas City, Mo., foundation contractor, and the Austin Bridge Co., Dallas, Tex., subcontractor, were able to use floating plant to build all the bridge piers. The same canals served the Taylor-Fichter Steel Construction Co., New York City, superstructure contractor, in delivering steel to deck travelers and in driving foundation piles for falsework towers.

A layer of soft muck 35 to 40 ft. thick covered with a thin vegetable mat only a few feet above river level prohibited use of land equipment on either side of the river. Below the

black marsh muck, the foundation material consists of fine and coarse sand to depths of 90 or 100 ft. On the south side of the stream, a sand spoil bank deposited from dredging operations in the river afforded access by car and truck to the center of the job.

Seven long spans at the center of the bridge rest on caisson piers sunk in pairs at eight locations through the sand strata to solid bearing on sand and on hard clay at depths of 90 to 102 ft. For the remaining spans, the piers are low concrete pedestals resting on untreated timber piles 70 to 86 ft. long driven

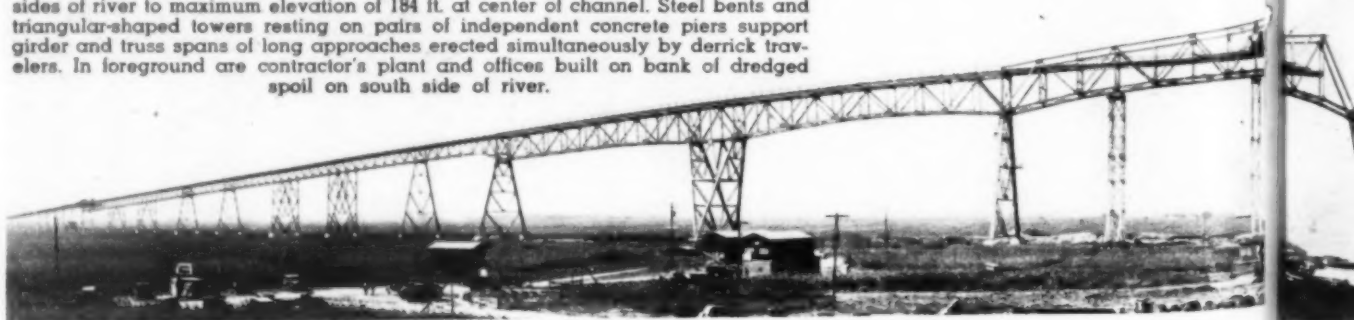
through the soft muck to firm bearing in the sand and clay. Most of these piles are battered to resist wind thrust on the structure. The foundation contractor sank the caissons through artificial sand islands, and the subcontractor developed a special floating piledriving rig for driving the many hundred batter piles.

Situated only one mile above Sabine Lake, which flows into the Gulf of Mexico, the bridge may be exposed to Gulf hurricanes, and the structure is designed for a wind load of 75 lb. per square foot, acting laterally, longitudinally or diagonally. As a safeguard against high winds

during erection, the erection procedure and falsework structures were planned to take care of wind loads of 25 lb. per square foot.

**Bridge Design**—To keep the cost of the entire project (including highway approaches on fills) within the \$2,750,000 provided by PWA grant, Texas Highway Department allotment and local bond issues of Jefferson County, the consulting engineers, Ash-Howard-Needles & Tammen, of Kansas City and New York, designed a superstructure supported by spread steel towers resting on independent low cylinder and pedestal piers. For longitudinal stability, the engineers

**NECHES RIVER BRIDGE** at Port Arthur, Tex., comprises total length of almost 1½ mi., carrying roadway on 5 per cent grade from filled highway approaches on both sides of river to maximum elevation of 184 ft. at center of channel. Steel bents and triangular-shaped towers resting on pairs of independent concrete piers support girder and truss spans of long approaches erected simultaneously by derrick travelers. In foreground are contractor's plant and offices built on bank of dredged spoil on south side of river.







**CONSTRUCTION CANALS** dredged 3,500 ft. to bridge abutments on both sides of river provide access by floating equipment to approach piers of long structure erected in midst of flat marshland 5 mi. wide. Mud-box cofferdam incloses group of piers in right foreground, where canal has been widened to permit construction of these units. Floating dragline is widening adjoining section of canal while floating piledriver waits around it to start driving foundation piles.



**FREE-SWINGING TRIANGLE** and plumb bar, supported in steel angle arms at side of leads, indicate direction and batter of leads.

incorporated in the design triangular shaped steel towers located as required in the various continuous-span-groups. Each triangular-shaped tower terminates in two points on independent concrete piers.

Extreme height of the trusses in the main span is 230 ft. above mean Gulf level, and maximum elevation of the roadway at the center of the span is 184 ft. A vertical clearance of

140 ft. for shipping extends across a channel 600 ft. wide between fender piles, with a central 400-ft. width providing a vertical clearance of 176 ft. Included in the 680-ft. main span is a 340-ft. central suspended span, swung after cantilever erection had been completed.

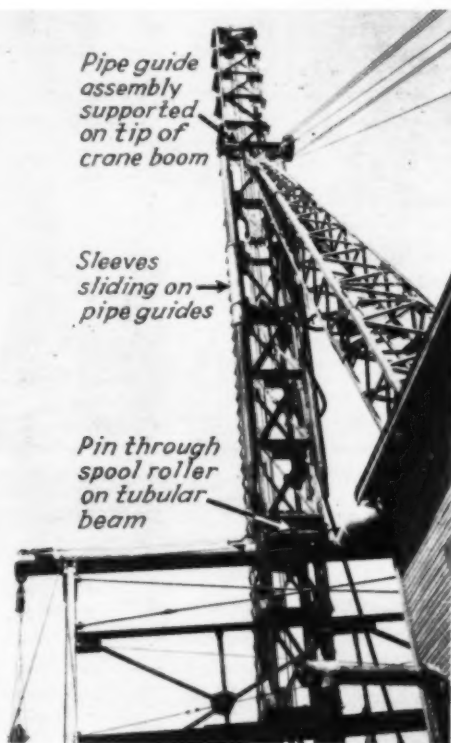
At the two ends of the steel bridge are groups of concrete girder spans, one group being about 400 ft. and

the other about 450 ft. long. The steel structure itself is symmetrical about the center span. Proceeding downgrade from the river span, the steel structure comprises a 374-ft. through-truss anchor span, two 300-ft. deck truss spans, eight deck truss spans alternately about 150 ft. and 170 ft. long, and finally, fifteen 60-ft. deck girder spans.

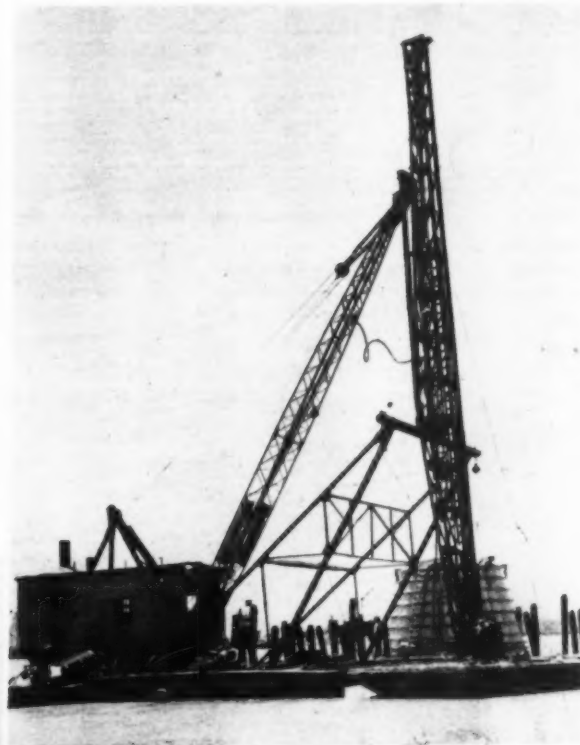
Triangular-shaped steel towers sup-

porting the river spans are 110-ft. wide at the base, although the trusses of the through spans above them are only 34 ft. apart, c. to c. On the deck spans, the distance between trusses or outside girders varies from 24 ft. to 19 ft., c. to c. The spread of the towers diminishes with the change to deck spans and with the decrease in height of the structure. The bridge carries a reinforced concrete roadway 22½ ft. wide between curbs, and the curbs are made 18 in. wide for use by pedestrians.

*Construction Canals*—Width of the river at the bridge location is about 1,000 ft. To open up the long approaches to access by floating equipment the foundation contractor excavated construction canals on the



**SLIDING SLEEVES** (left) on pipe guides connect leads to crane boom, permitting free movement of guides and enabling crane to incline leads in any direction without strain.



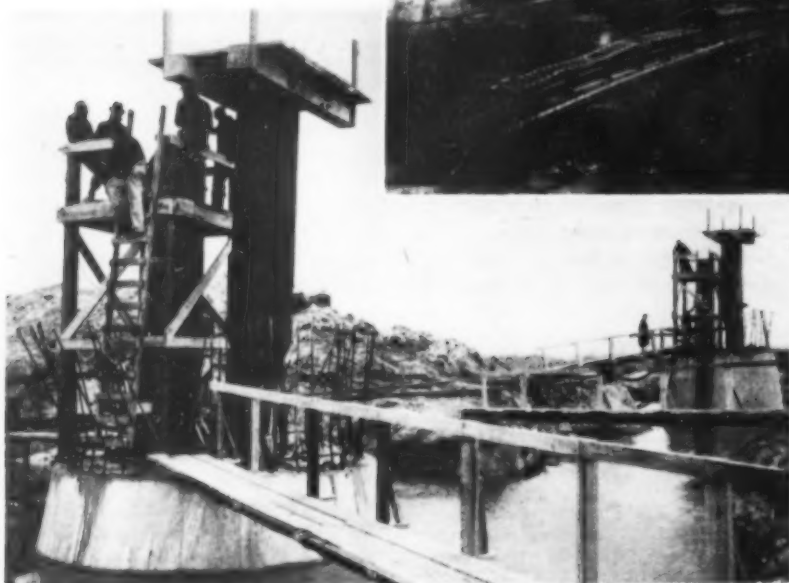
**FLOATING PILEDRIVER** for driving batter piles has 85-ft. leads supported by universal pin-and-roller mounting on horizontal tubular bar. Steam crane controls angle and direction of leads.



upstream side of the pier locations, 5,600 ft. long to the south of the river and 3,400 ft. long to the north. A heavy dragline mounted on a barge and operated as a dragline with a 2-yd. bucket cut the canals 60 ft. wide and 5 ft. deep.

Near the river, where pile piers supporting approach spans are separated by considerable distances, the piers were constructed by dredging spur canals at right angles to the main canal. Farther from the river, where piers are more closely spaced, sections of main canal were widened to include several pier locations. In both cases, after piles had been

**INDEPENDENT CAISSON PIERS** at eight locations are sunk through artificial sand islands by open dredging to deep clay stratum, where compressed air is applied to drop caissons final few feet into clay. Floating steam compressor plant supplies air, while floating change house (at left) for sand hogs is equipped with lockers, lunchroom and medical lock. Stiff-leg derrick erected on piles at each pier site handles construction of artificial sand island, open dredging and concreting. On opposite side of river is concrete plant set on piles over water and served by stiff-leg derrick.



**SAND HOGS** sink hollow circular caissons short distance into hard clay under air pressures up to 48 lb. per square inch. This sinking is aided by using water jet at cutting edge and ejecting liquid muck through blow pipe.

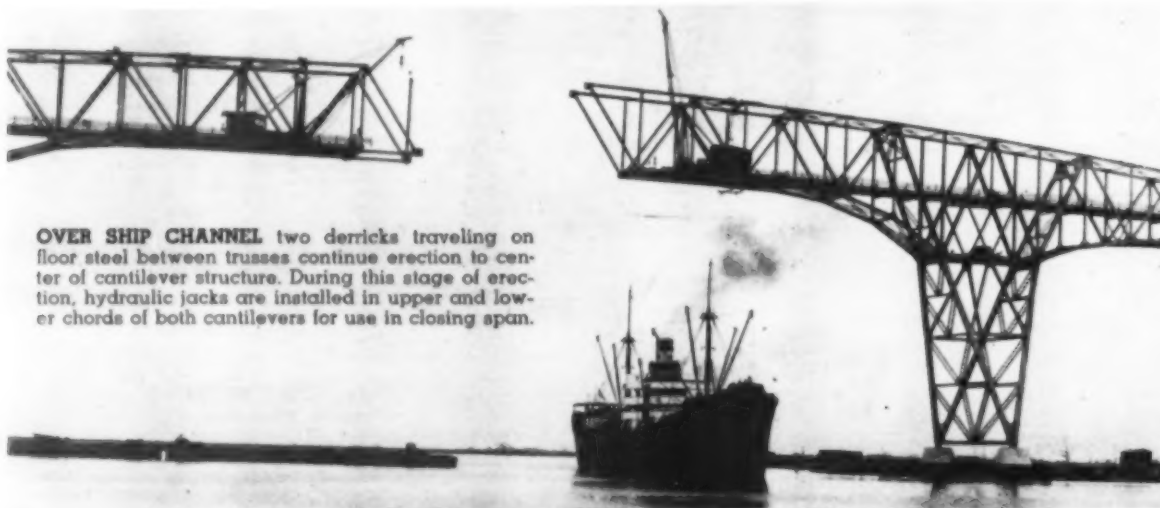
driven by the floating piledriver, the open ends of the side cuts were closed by mud-box cofferdams, and the remaining work of cutting off piles, building forms, setting reinforcing steel and placing concrete was performed on the semi-dry bottom of the pumped cofferdams.

**Driving Batter Piles**—To drive 1,580 timber piles 70 to 86 ft. long,

nearly all of them battered as much as 4 in. per foot, the Austin Bridge Co., designed and built a floating crane-operated piledriver of unusual flexibility. Steel leads 85 ft. long were pin-mounted on a pin running through a spool roller which was free to rotate or to travel on a tubular horizontal bar supported by trussed A-frames which overhung the



**TALL FALSEWORK TOWERS** under 300-ft. spans are reinforced against side reaction by outrigger arms anchored to piles. Lower portion of tower legs, made up of laced channels, is tied to next pier ahead.



**OVER SHIP CHANNEL** two derricks traveling on floor steel between trusses continue erection to center of cantilever structure. During this stage of erection, hydraulic jacks are installed in upper and lower chords of both cantilevers for use in closing span.

front of the barge. A steam-powered whirler crane sitting on the barge controlled the angle and direction in which the leads were inclined.

This control was effected through sliding pipe guides hung from the tip of the 65-ft. crane boom, as illustrated by photographs. The pipe guides passed through tubular sleeves rigidly attached to the leads, and the guides were greased to allow easy sliding of the pipes in the sleeves. By booming up or down and swinging the crane, the operator could incline the leads to drive batters up to 7 in. per foot in any direction. The front overhang of the horizontal bar permitted tilting the leads backward as well as forward.



**STARTING STEEL ERECTION** at lower end of approach, traveling stiff-leg derrick is assembled on first steel girder span, which is supported at one end by timber bent on foundation pier until concrete bent can be constructed.



**Steel Erection**—To erect the steel superstructure, the Taylor-Fichter Steel Construction Co. used two traveling stiff-leg derricks, starting erection at the lower ends of the approaches and moving ahead on both ends of the bridge to closure at the center of the river span. No falsework towers were required in erecting the fifteen 60-ft. girder spans of each approach. Pending erection of the steel truss into which the final girder span is framed, the free ends of the girders were supported by temporary H-section extensions spliced to the permanent steel bent. Beyond this point steel falsework towers on pile foundations were used at eleven places under the truss spans.

Transverse movement of the leads on the horizontal tubular bar for an overall travel distance of about 25 ft. was controlled by hauling lines operated by niggerheads on two deck engines.

An 85 hp. oil-fired boiler on the crane supplied steam for the hoist and swinging engines, for the two deck engines and for a 5,000-lb. double-acting super steam hammer. Outrigger pontoons steadied the front end of the barge.

**Caisson Piers**—Sixteen circular caissons 18 to 32 ft. in outside diameter were sunk through artificial sand islands constructed by driving at each site arch web steel sheetpiles 45 to 65 ft. long in a circle of 10 ft. greater diameter than the caisson. After dredging out the muck inside the steel sheeting with clamshells down to the sand at a depth of 30 to 45 ft. below mean Gulf level, the foundation contractor filled the cell with sand and set the short steel cutting edge of the caisson on the sand island thus created. The caissons are hollow, with heavily reinforced walls 5 ft. thick for the larger sizes and 4 ft. thick for the smaller. Walls were built up in successive lifts about 10 ft. high, using steel forms, while the caissons were sunk by open dredging inside the hollow cylinders, aided by jetting around the cutting edge. When the cutting edge reached hard clay, a conical

**FINAL GIRDER SPAN** is supported temporarily by H-section posts extending upward from steel bent on which first truss span will rest. After completing one falsework tower and setting truss units on ground in front of traveler, floating derrick has moved ahead to erect next falsework tower.



concrete cap and air locks were added at the top of the caisson, and air under pressures as high as 48 lb. was applied for sinking the last few feet into the clay and for sealing the bottom with concrete to a depth of 17 ft. in the dry. Interiors above the seal were allowed to fill with water after completion.

A steel stiff-leg derrick set on timber piles handled operations at each pier site. When setting long sheetpiles, the boom of this derrick was lengthened to 117 ft., but for dredging and concrete handling the length of the boom was reduced to 93 ft. A floating compressor plant served

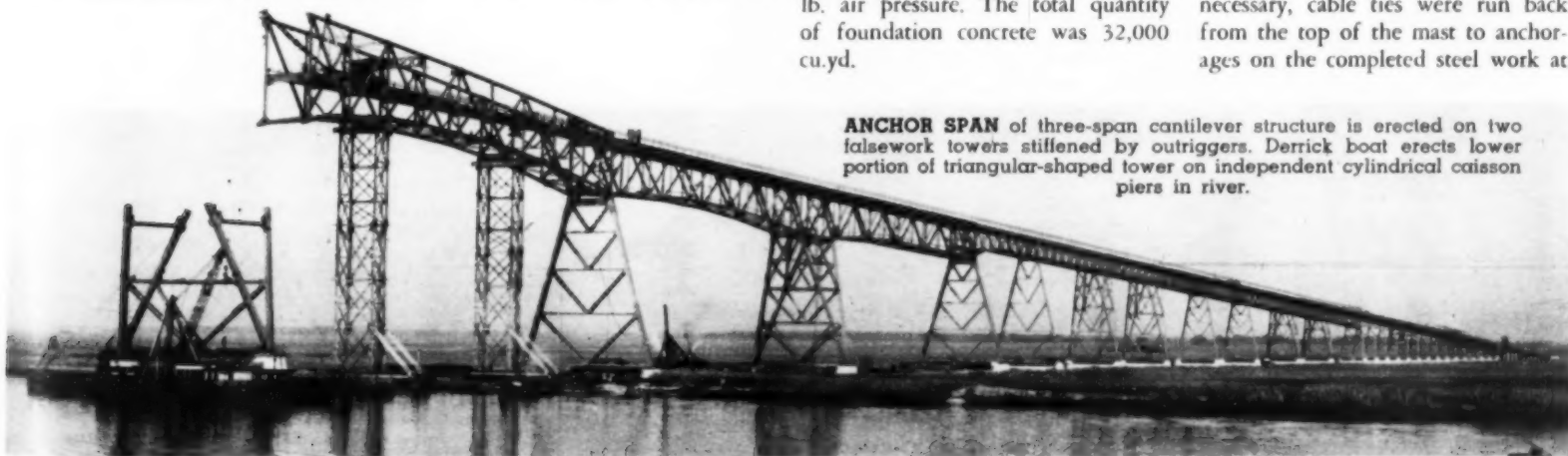
by three horizontal steam boilers furnished air to the caissons.

Concrete was delivered to all pier locations in buckets transported on barges from a mixing plant set up on piles offshore from the spoil bank on the south side of the river. Concrete materials were shipped to this plant in barges and were unloaded into overhead bins by a stiff-leg derrick set on piles. As an example of the amount of concrete required in foundation structures, one of the main river piers (4W) resting on clay at El. -102 took 2,500 cu.yd. of concrete, of which 300 cu.yd. went into the seal, placed under 38-lb. air pressure. The total quantity of foundation concrete was 32,000 cu.yd.

The river span was erected as a cantilever, without falsework.

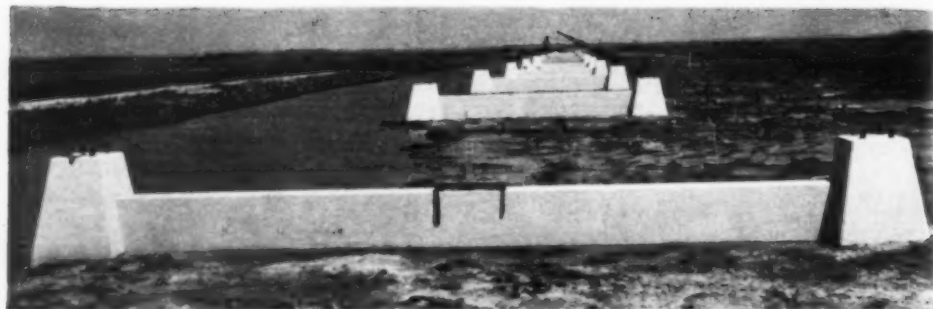
**Deck Travelers**—Stiff-leg derricks of 25-ton capacity equipped with 88-ft. booms were designed to travel on 19-ft.-gage track to permit operation between the trusses of the through-truss spans. Because of the narrow width of the travelers, derrick boats in the canal placed steel on the ground to permit the erection derricks to pick up their loads in front instead of at the side. At each erection set-up, the main frame of the traveler was anchored front and rear to the steel structure. To reduce the load at the heel of the derrick where necessary, cable ties were run back from the top of the mast to anchorages on the completed steel work at

**ANCHOR SPAN** of three-span cantilever structure is erected on two falsework towers stiffened by outriggers. Derrick boat erects lower portion of triangular-shaped tower on independent cylindrical caisson piers in river.





**INSIDE MUD-BOX COFFERDAM (left)**, pumped out to semi-dry condition, workmen cut off timber piles to grade and erect forms for concrete pedestal piers.



**APPROACH SUBSTRUCTURES** consist of low pedestal piers founded on timber piles and joined by single horizontal strut.

the rear. A special socket for the mast, which was only 30-ft. high, resisted uplift when the traveler picked up heavy loads with a high boom.

**Falsework Towers**—Steel towers on timber pile foundations were used at six points under the eight deck truss spans of alternate 170 and 150-ft. length. A tower was placed under each of the spans except two of the shorter ones which rest at both ends on permanent triangular-shaped towers.

Under the first of the two 300-ft. deck truss spans (designed as a continuous two-span group), it was necessary to erect two falsework towers to advance the structure to a permanent triangular shaped tower. The completed span then served to anchor the second 300-ft. span while it was cantilevered a greater distance to a single falsework tower which sufficed for the erection of the second span. Height of the falsework towers under

the 300-ft. spans had increased to an extent that required additional stability to resist a lateral wind load of 25 lb. per square foot on the falsework and uncompleted structure. The additional stability was furnished by outrigger arms anchored to piles to resist both thrust and uplift.

For the 374-ft. through truss anchor span of the cantilever construction approaching the river, two falsework towers were required. After erecting steel to the first falsework tower, at the third panel point, the

structure was lashed to the tower to resist longitudinal forces, and these lashings remained in place until erection of the span was completed. The second tower, at the seventh panel point of this eleven-panel span, was the highest on the project, the tower legs reaching an elevation of 150 ft. Each leg consisted of two 18-in. 42.7-lb. channels to a height of 86 ft. and of a 12-in. WF. 65-lb. beam for 54 ft. above this height.

Structural brackets extended out from the tower in the direction of the approaching traveler were used where necessary under the truss spans to pick up parts of the erection load one panel point in advance of the tower itself. Hydraulic jacks and shims were employed to pick up and control the amount of load on the bracket. Similar jacking equipment served to pick up and maintain the load at the tower tops. After erection of a span had been completed, the jacks on the tower tops were released

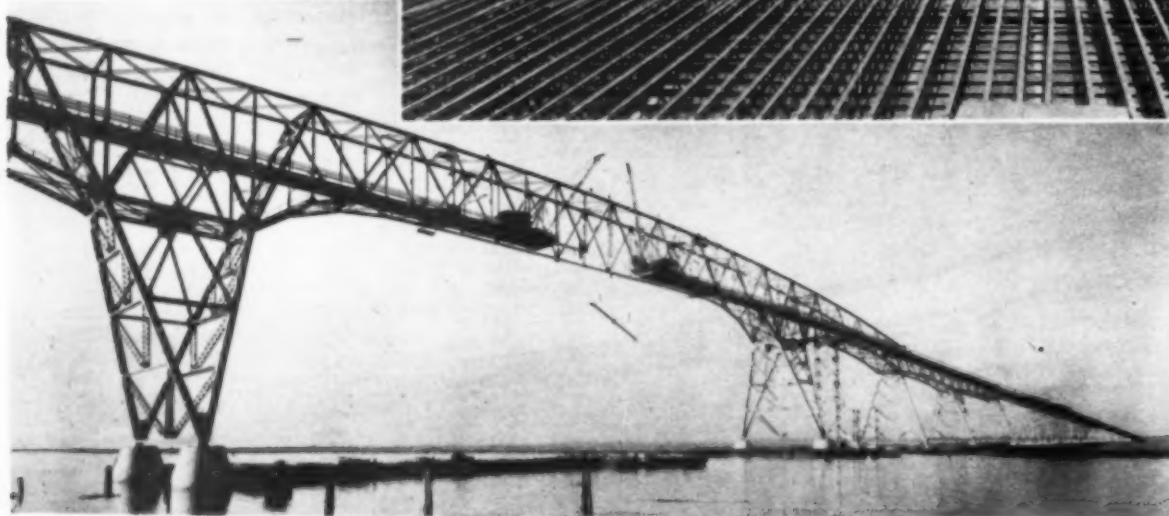
to permit removal of shims and dismantling of the tower.

**Cantilever Span**—As erection of the central span of the three-span cantilever structure progressed outward from both sides toward the center of the river, hydraulic jacks of 300-ton capacity were installed in the upper and lower chords at the connections between the cantilever arms and the central suspended span. The upper jacks, set in the top chords at the slotted pin connections which provide free relative movement of the spliced members in the finished structure, were arranged to shorten or lengthen the top chord for closing the span. The lower jacks, set in the bottom chords at the panel points where the suspended span is supported, were similarly arranged to lengthen or shorten the lower chords for closing the span.

Cantilevered portions of the suspended span were erected slightly high, and closure of the top chord



**DECK REINFORCEMENT** consists of rolled open-web I-section trusses laid longitudinally on steel spans. Long rolling shed traveling on steel handrails of bridge protects concrete during and after placement. Pipe line from concrete pump set on completed roadway at rear delivers concrete to deck forms.



**AFTER CLOSURE** of top chords, final lower chord members are raised from barges and spliced into structure, hydraulic jacks in bottom chords being utilized to make this splicing possible. Vertical clearance of 176 ft. makes bridge tallest highway structure in south. Extreme height of steel is 230 ft.

at the center of the span was made by lowering the cantilevered ends with the upper chord jacks to permit driving closure pins. Closure of the lower chord at the center was then made by jacking at the bottom chord points, thus slightly raising the span, about 230 tons per truss being required. After closure, these jack



loads were reduced to 115 tons, and the top chord jacks were entirely released. This release resulted in horizontal movement away from the river of the ends of the cantilever arm, thus releasing the bottom chord jacks and automatically swinging the span.

**Concrete Floor**—Concrete roadway deck of the bridge is reinforced with rolled open-web I-section Jaltrusses, a new development in open-web reinforcement. Concrete for the deck slab was pumped into place through pipe line from a portable concrete

pump set up on the completed road.

**Administration**—The Neches River bridge was built by the Texas State Highway Department under the direction of G. G. Wickline, engineer in charge, on temporary leave of absence from his position as engineer of bridges for the department. P. V. Pennybacker was construction engineer on the project. The bridge was designed by Ash-Howard-Needles & Tammen, consulting engineers, Kansas City and New York. George E. Cole and Giles H. Ed-

wards acted at different times as resident-engineer inspectors for PWA.

Contract for the substructure was held by the Union Bridge & Construction Co., Kansas City, Mo., of which C. A. Neal is president, O. S. Sollars is superintendent, and W. S. Reeder is engineer. The Austin Bridge Co., Dallas, Tex., acted as subcontractor on all approach piers having pile foundations, and also drove the fender piling on both sides of the river channel. J. B. Templeton, vice-president, Joseph Grace, su-

perintendent, and William Crabtree, superintendent, were actively in charge of the work for the subcontractor.

A superstructure contract valued at \$1,613,500 was completed by the Taylor-Fichter Steel Construction Co., New York City, under the direction of S. E. Kapelsohn, construction manager. This contract involved the erection of 9,285 tons of structural steel, in addition to the concrete girder spans at both ends of the approaches.

## Portable Pressure Unit Cuts Lubrication Time



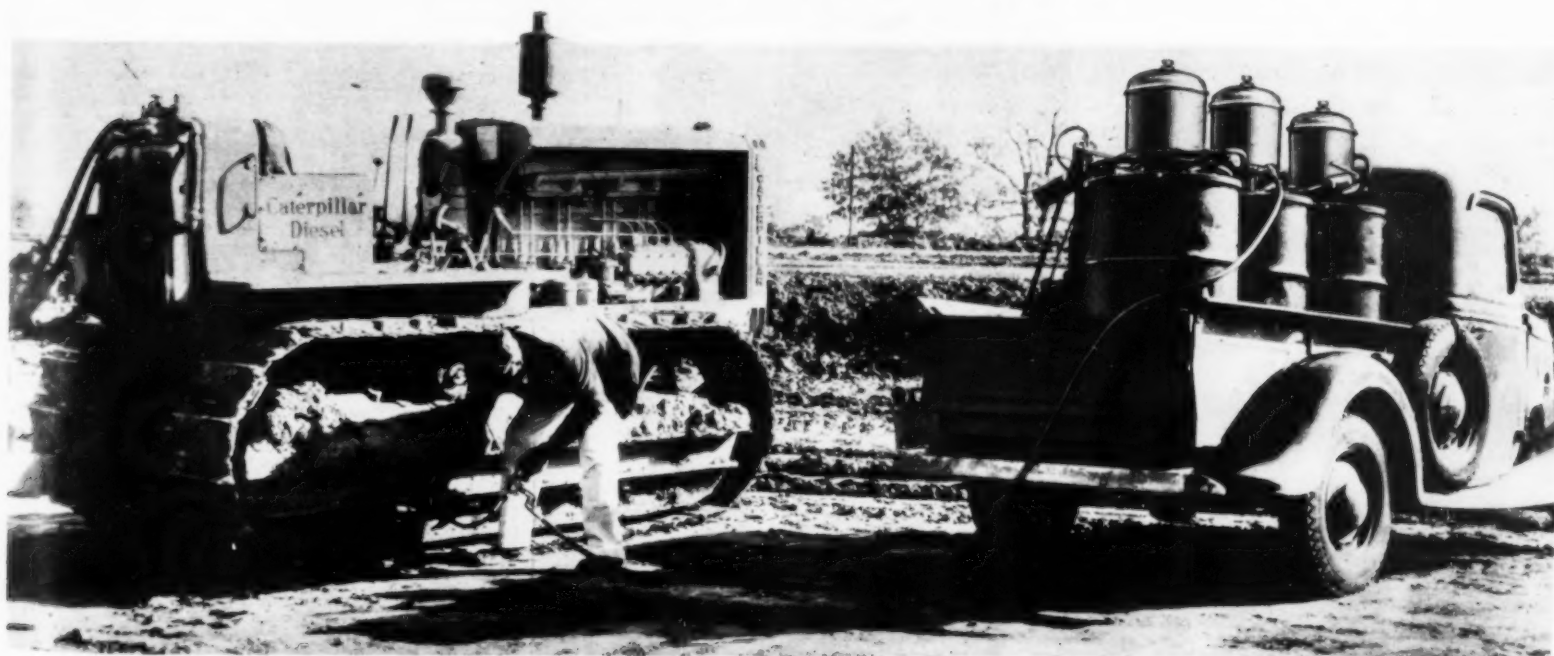
**COMPRESSED AIR** readily available from portable lubrication unit makes it easy to maintain tires at proper pressure, to spray-paint equipment and to keep machinery clean.

**A** PORTABLE UNIT for power lubrication of tractors and other heavy machinery on the job, recently tested on the proving grounds of one of the largest tractor manufacturers, indicates savings of as much as two-thirds of the time involved in hand methods.

Designed by the Alemite division of the Stewart-Warner Corp. for mounting with a gasoline-driven air compressor on a pick-up truck or trailer, the equipment consists of pumps, hose and control valves for handling high pressure lubricant, gear lubricant and motor oil direct from original 400-lb. barrels. Automatic controls maintain a normal air pressure of 150 lb. in the storage tank. Hose connections between compressor and pumps eliminate danger of breakage in these lines.

High pressure lubricant is delivered at a pressure of about 30 times the pressure in the air storage tank. Gear lubricant and motor oil are delivered at pressures of about eight times the air pressure. The low pressure pumps are capable of delivering about 14 lb. of lubricant per minute. Gear compartments of the largest tractor in common use hold a total of 136 lb. of lubricant. The tests show that 1/4 lb. of high pressure lubricant can be injected into a bearing of a track roller in 2 1/2 sec., about one-eighth of the time required by hand methods.

Outlets are provided for attaching an air hose to the compressor to keep tires inflated at proper pressures and to provide compressed air for cleaning machinery or for spray-painting equipment. All pumps are sealed tightly against damage by weather or abrasive dirt. Pumping from original containers eliminates rehandling losses and danger of contamination by grit.



**PORTABLE LUBRICATION UNIT** includes high pressure barrel pump which greases track roller in 2 1/2 sec. Unit also is equipped to pump gear lubricant and motor oil from barrels.

# Railroad Grade Separations

## *Built Under Traffic*



**FIRST STAGE** . . . Temporary Pile Bents and stringers carry track load during construction of abutments for wider span at 11th St. underpass, Tulsa, Okla.



**FIRST STAGE** . . . Abutment Footing in foreground will be excavated 14 ft. below foundation of adjacent building. Contractor plans to drive steel sheeting and to support sheetpiling with cast-in-place concrete wales and struts. Footings rest on blue shale. Falsework piles go to rock.



**SECOND STAGE** . . . Steel Girders, after completing service as needle beams during construction of abutments, are placed on falsework parallel with bridge to be cast in concrete slab.

**T**O CONSTRUCT or reconstruct railroad overheads with minimum interruption of railroad traffic, the Oklahoma State Highway Commission, in carrying out its federal grade separation program, made extensive use of its tested method of erecting steel girders and casting concrete in new spans on temporary supports alongside the bridge locations before sliding the completed spans into position on permanent piers or abutments built between timber pile bents under the tracks. This procedure was followed with success on a number of grade separations in Tulsa, three of which are illustrated by accompanying photographs. Although all the photographs were taken on one day, they show different stages of the highway department's procedure, a separate stage being in progress on each of the three projects. By way of comparison, additional photographs illustrate operations on two large grade separations, an underpass and an overpass, in the neighboring state of

Arkansas, where the State Highway Commission built these structures, in Little Rock and North Little Rock, without stoppage of railroad service.

*First Stage*—Primary operations of the Oklahoma procedure are illustrated by photographs of the 11th St. underpass, Tulsa, where the List & Weatherly Construction Co., Kansas City, Mo., contractor, excavated foundations and built new concrete abutments preparatory to replacing an existing single-track steel girder span of the Midland Valley R.R. with a longer span providing needed greater street clearance. The new bridge is so designed that a second railroad track can be added in the future when needed. Under its contract, valued at about \$52,000, the List & Weatherly Construction Co. placed on concrete piers at two sides of the street a skew span utilizing girders 74 ft. long to provide a clear roadway width of 60 ft. between curbs. Sidewalks 7 ft. wide pass through concrete end spans of the bridge between the piers and abutment walls.



**AT RIVERSIDE DRIVE UNDERPASS, Tulsa, stand (left to right) P. F. BLAIR, superintendent, Williams Bros. Corp.; W. G. ANDERSON, foreman; FLOYD H. OAKLEY, instrumentman; GEORGE D. COWDEN, inspector; JAMES H. SCOTT, resident engineer in charge for Oklahoma Highway Commission.**



**Second Stage**—As the piers and abutments of a grade separation structure approach completion, it is the practice of Oklahoma constructors to erect falsework parallel with the bridge where necessary and place on this falsework the structural steel and the concrete deck of the new span. Photographs of the Riverside Drive grade separation structure, built by Williams Bros. Corp., Tulsa, at the east end of a single-track Midland Valley R.R. bridge crossing the Arkansas River, illustrate this stage of the construction procedure. A narrow underpass between closely spaced pile bents at the site was improved by the new bridge to provide a 39-ft. 8-in. clear roadway between pier faces 41 ft. 2 in. apart. Value of the contract was \$42,750.

At one end of the new bridge, adjacent to an existing pier supporting the final deck truss span of the railroad's river crossing, is a reinforced-concrete pier, with a tunnel

for a 5-ft. sidewalk, framing into the existing railroad pier. At the other end is a reinforced-concrete abutment, with a similar sidewalk tunnel, designed to retain backfill of porous material placed directly against the back wall of the abutment and wing walls. Both the pier and the abutment rest on rock at a depth of 30 ft. or more below the surface.

To carry the railroad track the design called for a steel and concrete deck slab incorporating four 36-in., 280-lb. I-beams, 46 ft. 8 in. long. Before erecting the parallel falsework on which the deck slab was to be precast, the contractor utilized the permanent steel members as temporary transverse needle beams to support the track during construction of the pier and abutment. The temporary needle beams rested on groups of timber piles at the two sides of the track, beyond the limits of the pier and abutment. With these beams in service, the contractor was



ON 11TH ST. UNDERPASS, Tulsa, are (left to right) C. R. MELTON, assistant highway engineer, Bureau of Public Roads; JOE KEELEY, resident engineer in charge for Oklahoma Highway Commission; GEORGE DAVIS, superintendent, List & Weatherly Construction Co.; GEORGE C. MORAN, inspector.



**SECOND STAGE** . . . Ready for Form Erection, four 36-in. girders rest on 4-in. timber blocking shod with steel plate for sliding on channel track when span is moved into place on concrete abutments. Abutment in background is designed to take thrust of railroad fill.

#### FIRST STAGE

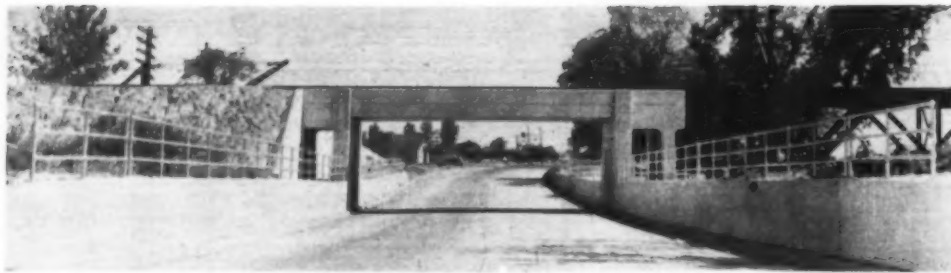
Other Abutment (right) is constructed inside steel sheeted pit braced with timber wales and struts. Concrete chute is in position on railroad trestle to start placement of 72 cu.yd. in 11-ft. lift of abutment wall. Footing of this abutment contains 112 cu.yd. placed monolithically in 6 hr. 15 min. by pair of two-bag mixers using 1½-min. mixing time.



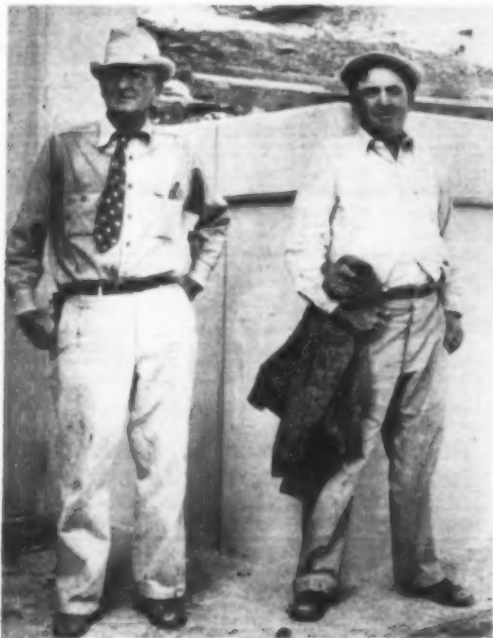
**SECOND STAGE** . . . After Construction of Abutments for new Riverside Drive underpass, track load is transferred to timber bents resting on these structures, permitting removal of steel needle beams. In foreground appears top of pile cluster which supported transverse needle beam at this point. Sidewalk tunnel of near abutment frames into existing concrete pier of steel truss railroad bridge.



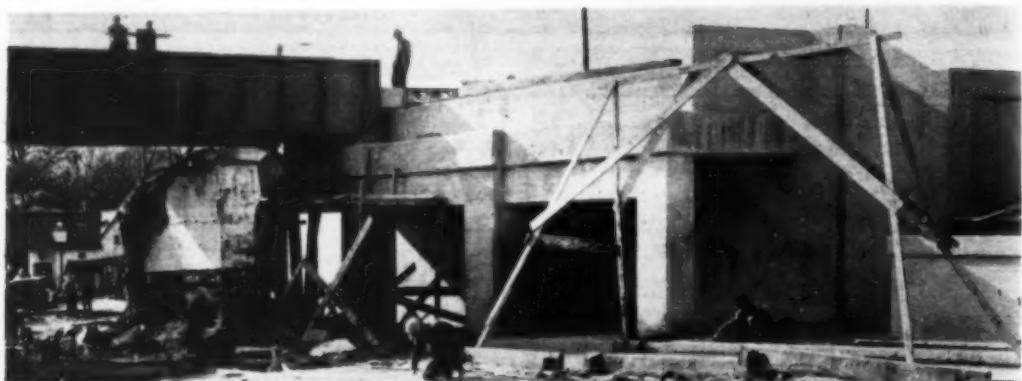
**THIRD STAGE** . . . After Sliding Completed Span of 15th St. underpass into position, on new piers, contractor starts demolition with pneumatic tools of old piers which formerly supported dismantled short span.



**RIVERSIDE DRIVE UNDERPASS** before (right) and after replacing narrow pile trestle openings with steel girder and concrete span crossing 40-ft. roadway. Tunnels in abutments provide openings for side-walks several feet above roadway level.



**15TH ST. UNDERPASS**, Tulsa, is built under supervision of (left to right) R. F. RATCLIFF, inspector for Highway Commission; HOWARD FRYE, superintendent, W. R. Grimshaw Co.



**THIRD STAGE** . . . Piers Designed for additional future tracks provided support for new span during erection of plate girders and casting of deck prior to sliding span into permanent position.

able to remove existing pile bents at the two substructure sites and build the pier and abutment.

After the two substructure units had been carried to desired elevation under the needle beams, the track load was transferred from the beams to timber bents resting on the concrete structures, and the contractor removed the temporary needle beams to encase them in the concrete slab.

Total weight of the precast slab was estimated at about 150 tons.

When cast on the temporary timber falsework, the slab rested at both ends on 4-in. timber blocking shod with long 6-in.-wide steel plates having chamfered ends and staggered drilled holes to furnish grease for lubrication. Each of these steel runners traveled on the inner web of a 12-in., 25-lb. steel channel 32 ft. long, ground where necessary to provide a smooth sliding surface. The contractor planned to pull the slab into position with a single power

winch on a 60-hp. tractor, using a bridle to equalize the pull.

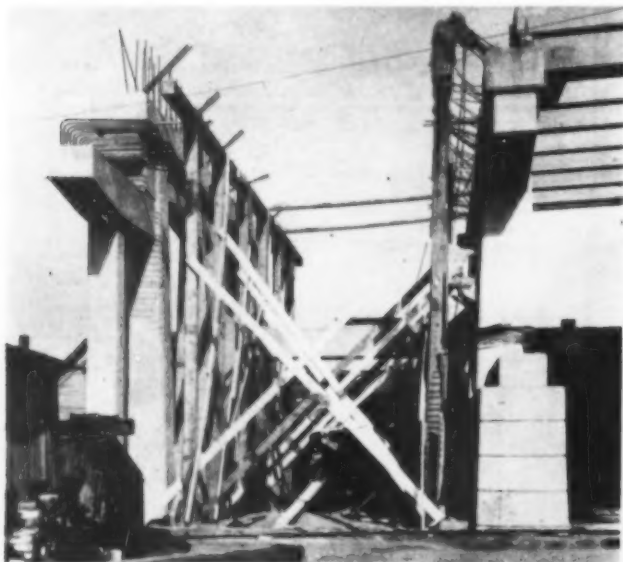
*Third Stage*—Final steps in the reconstruction of a railroad overhead are indicated by accompanying photographs of the 15th St. underpass, completed by the W. R. Grimshaw Co., Tulsa, contractor, increasing a narrow existing span to a length of 54 ft., center to center of bearings under the plate girders of the new span. Sidewalk tunnels pass through short concrete end spans. The piers provide seats for three railroad tracks, although only one track is carried at present.

Total weight of the single-track span was about 100 tons,—60 tons of steel (including a split-I-beam-lock floor on which the concrete slab was placed) and 40 tons of concrete. Because of the provision for later track additions, the inside plate girder weighed 24 tons in comparison with

14 tons for the fascia girder.

After casting the concrete deck slab of the new span, the W. R. Grimshaw Co. lifted out the old span with a steam locomotive crane, rented for the purpose from the List & Weatherly Construction Co., and slid the new 100-ton span into position on greased steel rails laid on 12x14-in. timbers, moving the span with ratchet jacks acting against railroad spikes driven into the timbers. About 4 hr. jacking time was required to move the 16-ft. width of the new span. With the new span in position, the contractor began the demolition of the old piers and roadway widening under the bridge.

*Arkansas Grade Separations*—Different operations were involved in the construction of two new grade separations within a short distance of the Arkansas State Capitol. In depressing 7th St., Little Rock, under



**TIMBER BENTS** are erected for short concrete span adjoining final steel span. Concrete bent under steel span rests on collision wall.



**ARKANSAS UNDERPASS** is built under single track, in foreground, and double tracks, in background, supported on timber bents to permit subway excavation.



two main-line tracks of the Missouri Pacific and a single track of the Chicago, Rock Island & Pacific, the Uvalde Construction Co., Dallas, Tex., contractor, had to remove estimated quantities of more than 10,000 cu.yd. of solid rock excavation and almost 13,500 cu.yd. of unclassified excavation, in addition to more than 3,000 cu.yd. of dry excavation, 265 cu.yd. of wet excavation, and almost 2,500 cu.yd. of solid rock excavation for structures. Quantities of more than 2,700 cu.yd. of concrete for bridges, more than 111 tons of reinforcing steel, more than 240 tons of structural steel (in the beam spans), almost 5,700 sq.yd. of concrete pavement reinforced with more than 23,000 lb. of steel, together with a multitude of important incidental structures, ran the value of the contract to more than \$186,000. Accompanying photographs indicate the contractor's methods of supporting the double-track main line of the Missouri Pacific on temporary falsework (to permit subway excavation) and of building box culverts and other drainage structures.

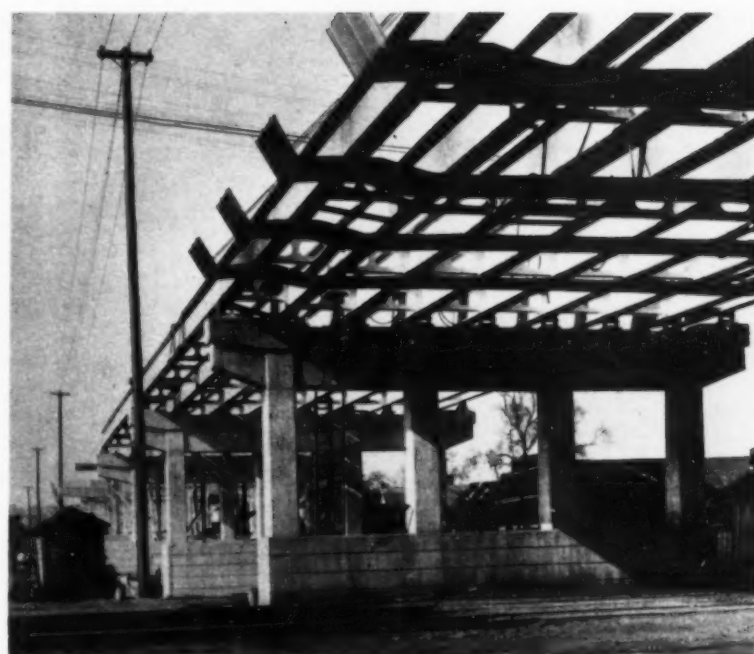
**Overhead Bridge**—For a long concrete and steel overhead carrying Locust St. across a number of yard and service tracks in North Little Rock, a low bid of \$181,000 won the contract for Fred Luttjohann, Topeka, Kan. Twelve concrete spans and four steel spans of this long structure rest on seventeen reinforced-concrete bents supported by precast concrete piles about 20 ft. long. At each end of the overhead are six reinforced-concrete girder spans of uniform 46-ft. length. Between the two sets of concrete spans are the four steel girder spans, crossing the railroad tracks. Three spans are 75½ ft. long, and the fourth is 107½ ft. long.

Bents under the concrete spans consist of three columns with six foundation piles under each column, making a total of 18 piles per bent. Under the steel spans the bents rest on collision walls providing for present or future railroad tracks. At the two ends of the steel section, the bents consist of three columns, and the collision walls each rest on 22 concrete piles. Intermediate bents in the steel section have four columns, supported by 32 piles.

Under one of the intermediate collision walls, it was necessary, in order to get adequate bearing, to extend the 32 piles by post-piling, cutting back the concrete on the driven pile about 30 in. to cast an extension in place. After the extension had been cast, the pile was left standing 21 days before driving was resumed.

Estimated contract quantities called for 7,665 lin.ft. of concrete piling and more than 3,800 cu.yd. of concrete for the bridge, in addition to 2,900 sq.yd. of concrete pavement. Steel in the overhead involved 373 tons of structural steel in the beam spans and 374 tons of reinforcing steel for the bridge concrete. The contractor used ready-mixed concrete delivered in truck mixers.

**Administration**—For the Oklahoma State Highway Commission, Van T. Moon is chief engineer, H. X. White is bridge engineer, and Joe Keeley and James H. Scott are resident engineers in Tulsa in charge of projects in and around the city. On the three Tulsa grade separations described in these notes the men directing the work for the various contracting firms were: 11th St. underpass, George Davis, superintendent,



**FOUR STEEL GIRDER SPANS** at center of overhead bridge cross present and future locations of railroad tracks. Four-column bents are protected by collision walls at base.

List & Weatherly Construction Co., Kansas City, Mo.; Riverside Drive underpass, P. F. Blair, superintendent, Williams Bros. Corp., Tulsa Okla.; 15th St. underpass, Howard Frye, superintendent, W. R. Grimshaw Co., Tulsa, Okla.

For the Arkansas State Highway

Commission, James R. Rhyne is director, W. W. Zass is chief engineer and N. B. Garver is chief bridge engineer. On the two projects here

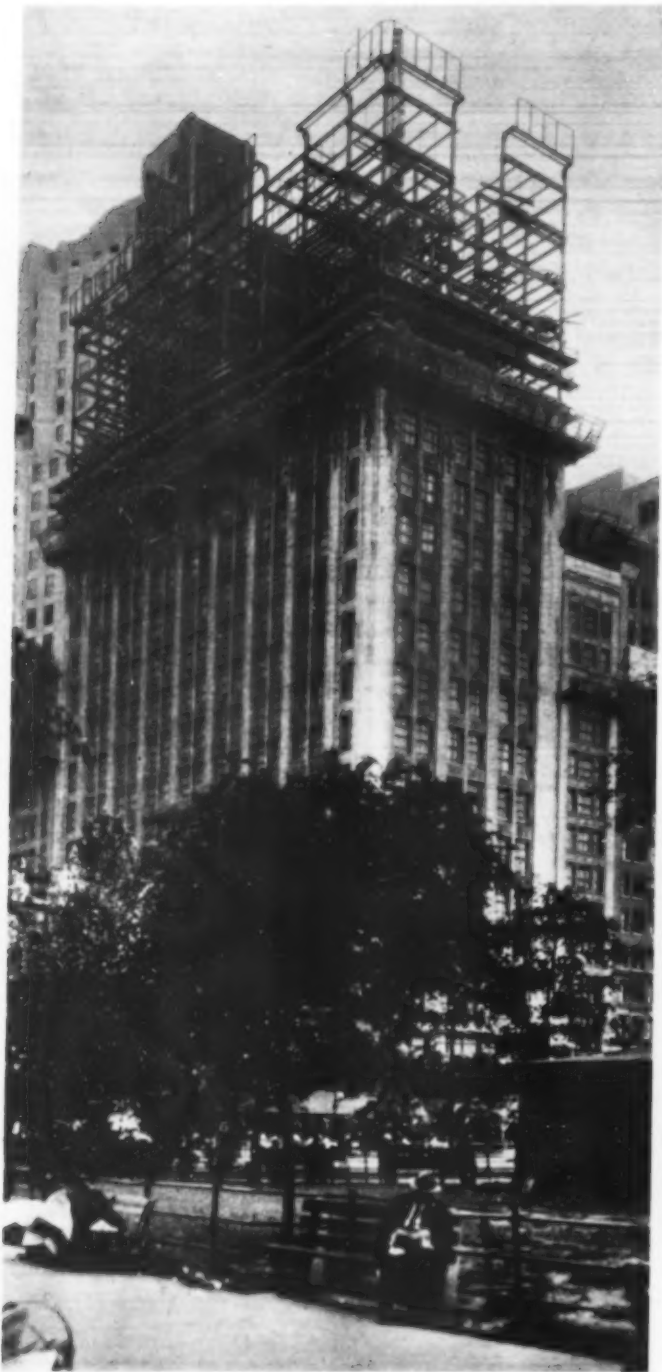


**ARKANSAS GRADE SEPARATIONS** are built under supervision of these men. FRED LUTTJOHANN (left), is contractor on Locust St. overpass, North Little Rock, where State Highway Department is represented by (center, left to right) W. M. TURNER, inspector; W. A. POE, resident engineer; and J. R. ANDERSON, inspector. L. W. BOYD (right) is superintendent for Uvalde Construction Co. on 7th St. underpass, Little Rock.



**DRAINAGE STRUCTURES** (left) built in connection with underpass make use of wooden forms and ready-mix concrete. Forms are being set for large double-box storm culvert in foreground. In background, near tombstones in stone cutter's yard, is long single box culvert.

described, J. H. Knott was resident engineer at the 7th St. underpass, Little Rock, and W. A. Poe was resident engineer at the Locust St. overpass, North Little Rock. Construction operations at the 7th St. underpass were directed for the Uvalde Construction Co., Dallas, Tex., contractor, by L. W. Boyd, superintendent. At the Locust St. overpass, Fred Luttjohann, contractor, Topeka, Kan., maintained general supervision over the work.



**TWENTY-STORY STEEL-FRAME BUILDING** succumbs to attack of expert wreckers, who use tractor-bulldozer to clean up debris on successive floors. Note catch-all below outside swinging scaffold and windows carefully boarded up to prevent escape of dust and dangerous flying objects.

A TWENTY-STORY steel-frame loft building at the corner of Madison Ave. and 25th St., New York City, has fallen under the systematic attack of the Albert A. Volk Co.'s demolition experts, who used for the first time on this project a tractor-bulldozer to clean up debris on successive floors of the tall structure. Operation of a bulldozer for this service speeded the actual clean-up and reduced greatly the man-hours of labor required. Under the former method of shoveling and wheeling, a crew of 40 men would have taken 2½ days to remove debris from a floor. Using the tractor-bulldozer, the same work was ac-

## Tractor-Bulldozer Speeds *Demolition* of 20-Story Office Building



**SKILLFUL MANEUVERING** of tractor-bulldozer by competent operator pushes pile of debris into elevator lobby on upper floor. Operator guides tracks of machine along edges of floor openings without slightest hesitation.



**PARTITION FALLS** before big push by tractor-bulldozer, which spills wall into elevator shaft.

complished in 1½ days with two men, a total of 3 man-days as compared with 100 man-days for the ordinary procedure. Only two wheelbarrows were employed on the entire job, and they were not used in moving debris.

Demolition by the old method had been contemplated when the wrecking plans were made, and two guy derricks were set up on the steel frame to handle steel pieces and bundles of debris. After completing the wrecking of three stories by hand, the contractor decided to put an International Harvester 20-hp. tractor equipped with a Gar Wood hydraulically controlled bulldozer on the seventeenth floor. The machine promptly proved its value and continued in service on successive floors until the basement was reached. A guy derrick raised the machine to the seventeenth floor and lowered it from floor to floor as demolition proceeded,





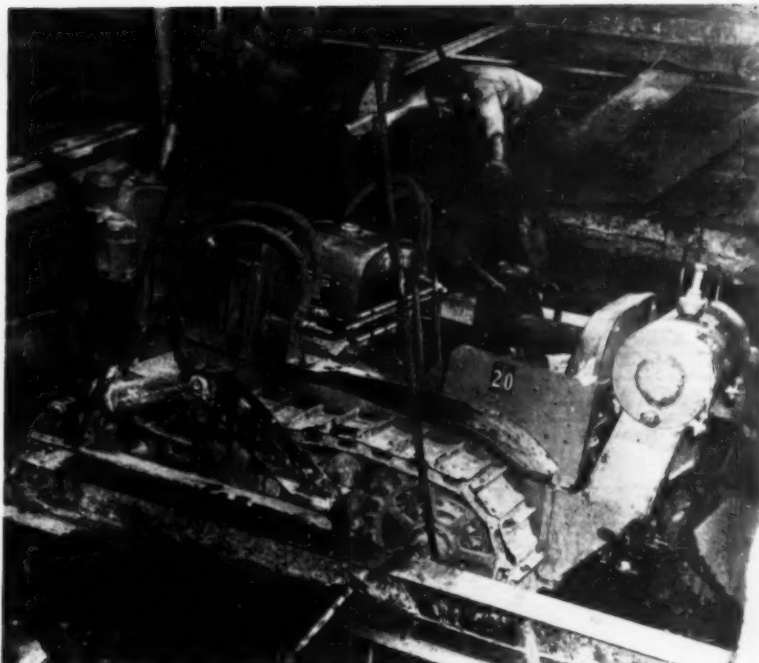
**FOLLOWING DEMOLITION** of concrete floor arches between steel beams, tractor-bulldozer is ready for lowering to next level.

but a chain-block will be sufficient for the lowering on future jobs, as the tractor-bulldozer weighs only 4 tons.

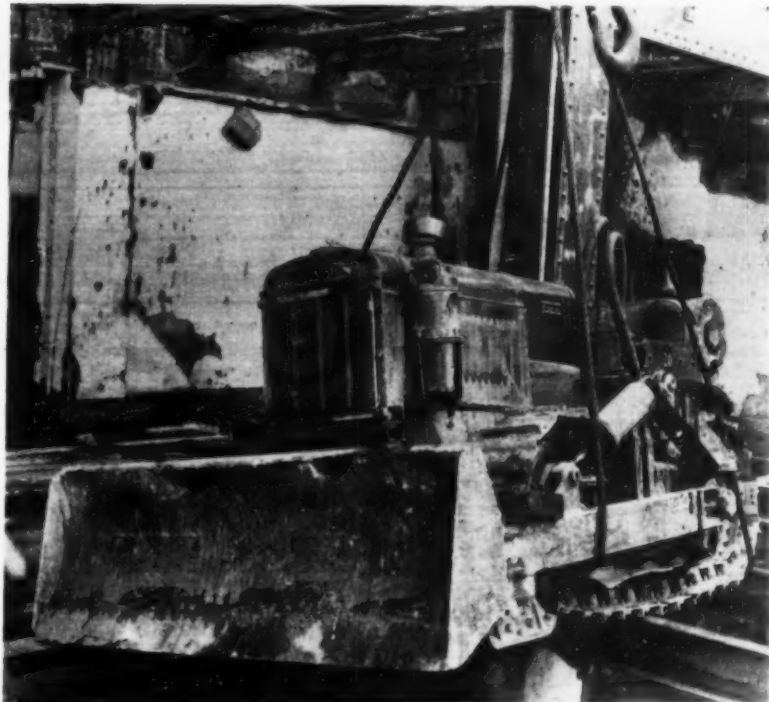
Debris removed from each floor by the bulldozer was pushed to openings in the floor through which the material dropped from one to three stories to a lower floor. Floor openings were staggered throughout the height of the building to prevent excessive creation of dust and to minimize accidents. After the bulldozer had pushed the debris off a floor, a crew of wreckers broke up the arches between the steel beams

with pneumatic busters and hand tools, the shattered concrete dropping to the floor below. When the arches had been broken out, the bulldozer was lowered to the next floor to clean up the accumulated debris. A mechanical method of breaking the floor arches will be used on future jobs.

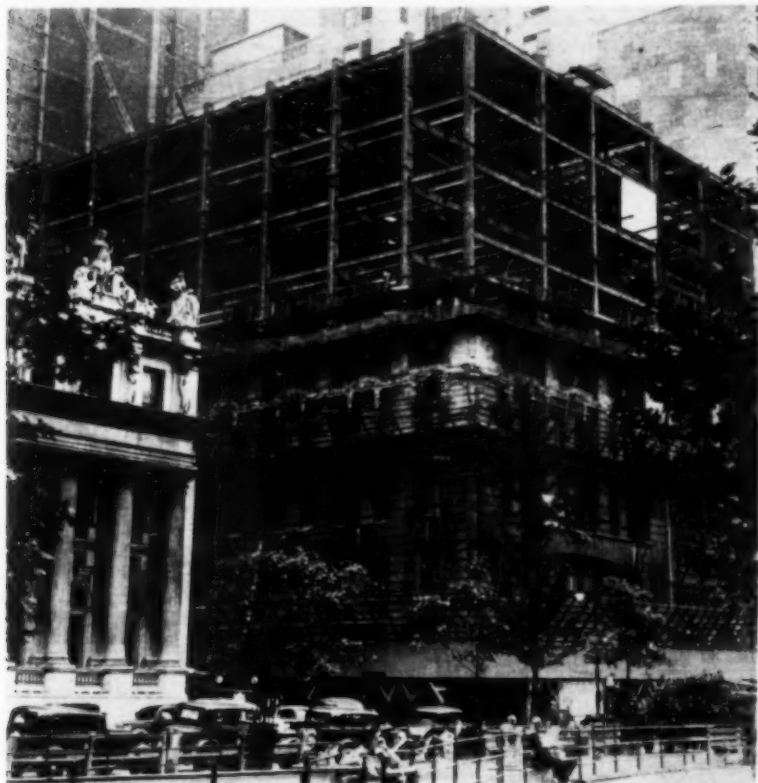
Customary careful practices of the Albert A. Volk Co. were followed throughout the job, carried on by the "upside down" method of demolition described in *CONSTRUCTION METHODS*, Nov., 1933, pp. 18-23. Innovations employed for the first time on the current job included a



**DOWN SHE GOES** to floor below, where piles of debris lie waiting for clean-up by bulldozer.



**TWO SLINGS** suspended from load line of guy derrick lower bulldozer to next floor.



**COMING DOWN!** Bulldozer works several stories below steel wreckers, who keep floor well planked against possible accidents.

loud-speaker telephone system with four stations on upper floors controlled from the central office on the street floor, making it possible for the superintendent to communicate promptly with any foreman in the building.

Oxygen and acetylene gases for five burning outfits were delivered through new hose lines up to the sixteenth floor from a central station under the control of one operator on the ground floor. Each torch drew gas from one acetylene tank and from four oxygen tanks, the latter connected to a single manifold, making a total of 25 tanks in use at the central ground station. Hose lines were equipped with safety

valves at the upper floors, enabling the torch operators to save gas by shutting off the lines without having to communicate with the ground station.

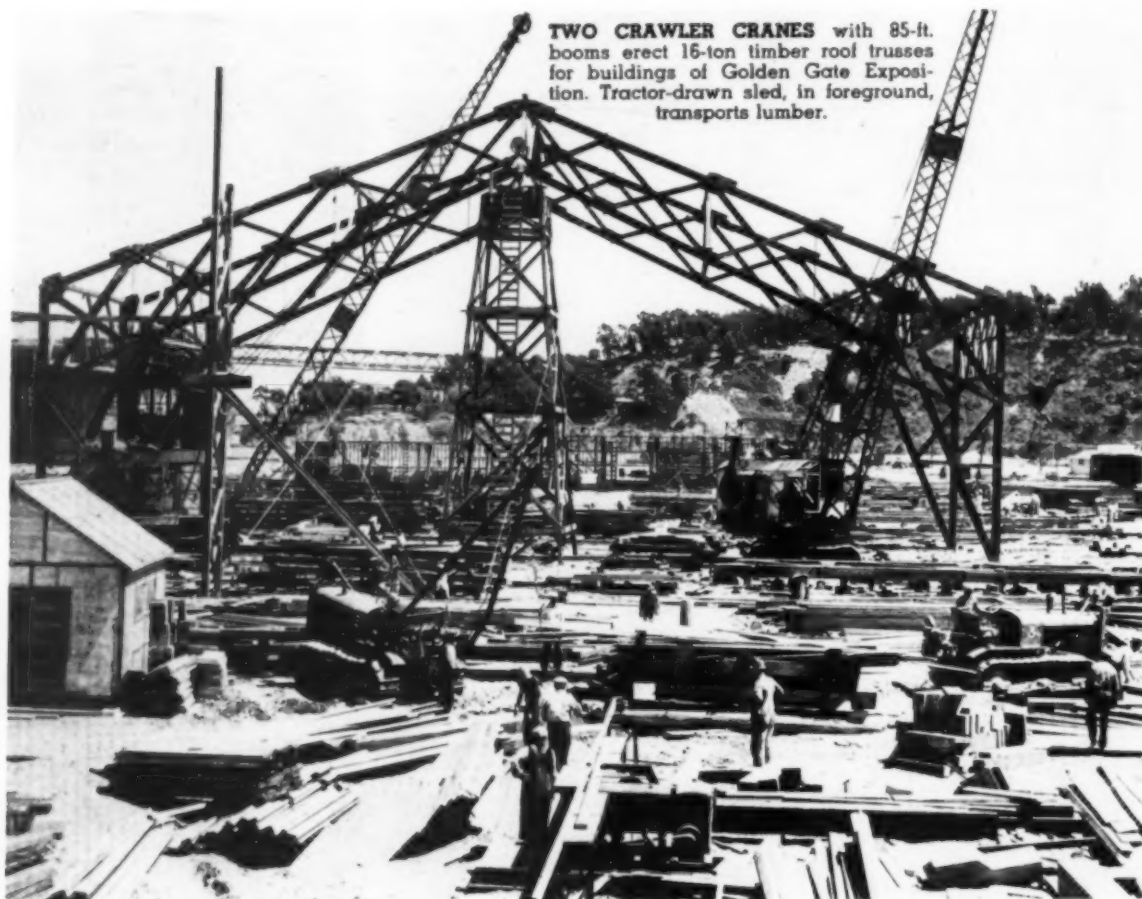
A contract for the demolition of the twenty-story (Dunbar) building was awarded to the Albert A. Volk Co., New York City, by the Metropolitan Life Insurance Co., which gradually is expanding its office building space to take in the entire area of this block and the adjoining block to the south. The contractor started work May 5 and completed demolition about Oct. 5. Operations of the Albert A. Volk Co., were carried out under the direction of A. K. Fleschner and Michael Sheriff.

# Varied Equipment *Handles Materials for*

## Golden Gate Exposition



**BOOM-RIGGED TRACTOR (left)** delivers lumber from railroad flat car to mill on job at Treasure Island, site of Golden Gate Exposition.



**TWO CRAWLER CRANES** with 85-ft. booms erect 16-ton timber roof trusses for buildings of Golden Gate Exposition. Tractor-drawn sled, in foreground, transports lumber.

A \$16,000,000 construction program on a 400-acre reclaimed island in San Francisco Bay presented a problem to builders of the Golden Gate International Exposition. As construction was started without roads or connections with the main land, the island site offered many difficulties to contractors. In spite of soft sand impassable to trucks and of seepage that leaked into excavations almost as fast as it could be pumped out, nearly 1,000,000 sq. ft. of floor space was put promptly under construction. The construction program was about six weeks ahead of schedule at the beginning of 1938.

With speed of construction a vital factor, unusual methods of distributing building material over the large site were required. Three major general building contractors, Guy F. Atkinson Co., MacDonald & Kahn,

and Clinton Construction Co., are on the site with big jobs, and each had different distribution problems to work out. As all material had to be brought in by water, it was decided that, in order to avoid congestion and confusion of shipments, each contractor should build his own docking facilities.

*Distributing Lumber*—The Guy F. Atkinson Co., requiring among other items 9,800,000 b. ft. of lumber on their location in the center of the island, solved the problem by building 1½ mi. of standard-gage railroad track from their docks to the various building sites. Originally this job, which includes six exhibit palaces 200x886 ft., 200x415 ft., and 178x753 ft., in pairs, was set up for all-water shipment of lumber, but because of a steamship strike lumber orders were placed with valley mills and shipments routed by rail. This change necessitated building a railroad apron in place of the wharf to receive flat cars from car barges. Thirteen cars carrying a total of 300,000 b. ft. are loaded on each barge. Required lumber has been transported to the site in addition to 1,400 77-ft. piles which were used for foundations.

In further distribution of materials from lumber yard, warehouse and mill, it was decided that the most efficient handling methods required the use of neither trucks nor hoists. Because of the softness of the fill and the wide expanse of the site, construction of temporary roads was out of the question. Instead, sleds measuring 12x20 ft. were built from short lengths of piling and hauled



**BUNDLE** of 2x10-in. pieces for one of exhibit buildings rides to destination behind tractor.



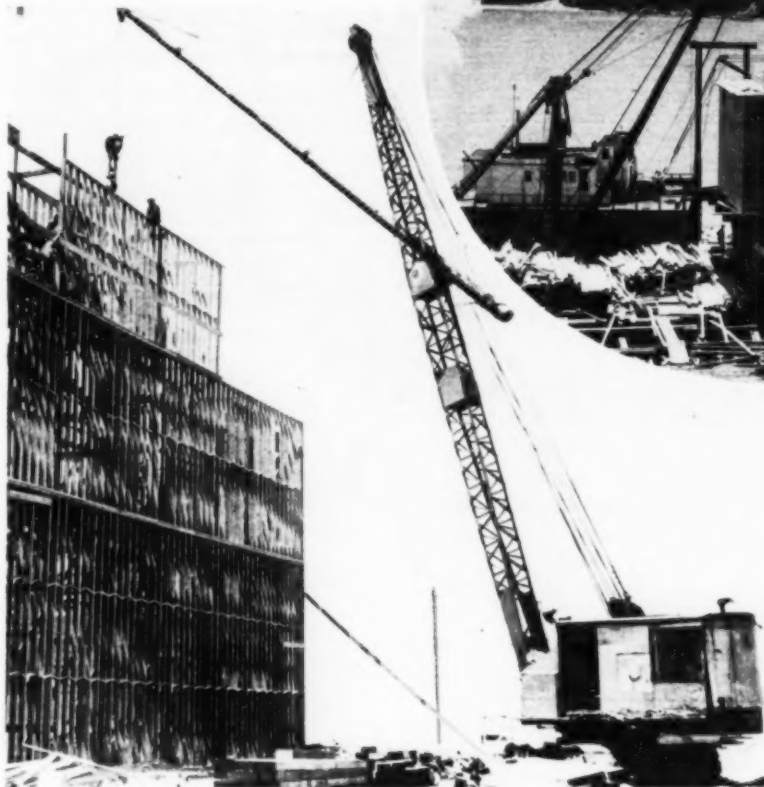
over the sand by tractors. To transport materials to respective points a fleet of four Allis-Chalmers 95 and three Caterpillar RD8 tractors are used. The former are equipped with bulldozers for use in grading when not employed in transporting material, and the latter are boom-rigged to facilitate loading and unloading of sleds. Railroad cars are unloaded by crane. Neither hoist nor elevator are used anywhere on this contract covering almost 800,000 sq. ft. of building space. Trusses are erected by two Bucyrus-Erie cranes with 85-ft. booms, and all roof material is hoisted with a 35-ft. boom extension.

**Airport Buildings** — In landing steel for the two 287x335-ft. concrete and steel hangars, MacDonald & Kahn, general contractors, constructed a row of dolphins driven adjacent to the rock wall along the yacht harbor. The trusses were then unloaded by a stiff-leg derrick and placed on flat cars which were rolled over a track running along the center line of the hangars. Cement and rock aggregates were transported by truck to a central bunker.

The Clinton Construction Co., general contractor for the airport terminal building, constructed a short temporary road from the concrete mixing plant at the waterfront to the job, a three-story semicircular concrete structure measuring 696 ft. in the outside dimensions and 410 ft. across the front elevation. All con-

**SACKED CEMENT (right)** is handled by stiff-leg derrick out of barges into 1,000-bbl. storage shed. Conveyor delivers 800 cu. yd. in 8 hr. to aggregate bins.

**50-FT. TIMBER JIB (below)**, lashed to 85-ft. boom, handles roof lumber.



crete materials are removed from the barge by a clamshell bucket and dumped upon a 24-in. conveyor rising to a large bunker at the head of the mixing plant. Four trucks running to two central concrete hoists keep up with a 2-min. mixing time of the 1-yd. mixer.

Design and construction of all Fair buildings are under the direction of W. P. Day, vice-president and director of works, Golden Gate International Exposition, with H. C. Vensano as chief of construction.

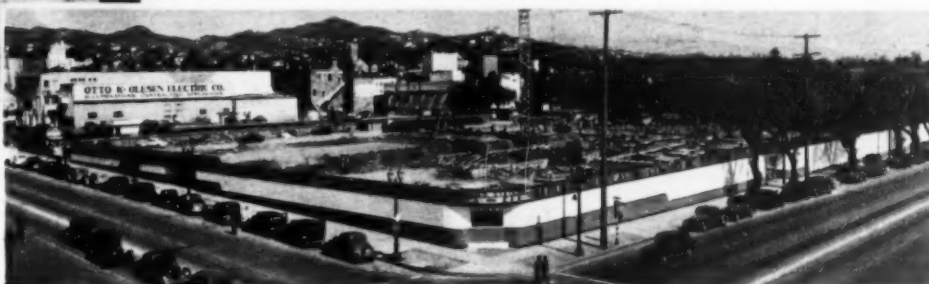


**OBSERVATION BALCONIES (above)** invite public to watch progress of job through wide glazed windows in construction fence (right) designed to test color scheme for finished building.

## Windows in Construction Fence *Ease Life for Job-Watchers*

**O**BSERVATION WINDOWS in a carefully designed fence around a 5-acre site where The Austin Co., Cleveland, is building new Hollywood, Calif., broadcasting studios for the National Broadcasting Co. have put the \$2,000,000 construction job on 24-hr. display. The fence spares curious pedestrians the usual eyestrain and contortions involved in peeking through

cracks and knot holes and also serves as a testing ground for colors to be used on the studio's exterior. Its rounded corners and setbacks at the observation platforms conform with lines which will characterize the three-story building when completed. Out of courtesy to existing sound studios nearby, builders are welding all steel on the job and are driving construction equipment with electric motors.





# DO BUILDINGS COST TOO MUCH?

By **SUMNER S. SOLLITT**  
*Sumner S. Sollitt & Co.,  
Chicago, Ill.*

I READ with considerable interest the article prepared by Arthur F. Comstock. Mr. Comstock has stated his case very accurately and his conclusions are of considerable interest to the industry. I agree with him, particularly in the statement that the contractors' organizations will have to be more active, more articulate and more adamant in protecting the interest of the public, as well as that of building. I think this point should be stressed, however, in a somewhat different way, and that there is not such a broad distinction as is popularly supposed between the interests of contractors' organizations and those of union labor engaged in the industry. I think an intelligent appraisal of the situation would bring out the fact forcibly that the stupidity and self-interest in the leadership of union organizations has been fully equalled by the stupidity and lack of interest encountered in contractors' organizations, during the past five years.

In Chicago, the anxiety of union labor to increase wage scales so as to get the maximum haul for themselves on government-financed work has met with relatively no opposition from the contractors, as it has apparently made little difference to the contractors what kind of wage scales they paid on Federal work just so they all paid the same scales. Of course this has run wage scales entirely out of line with the demand for construction services in private industry. The result has been an increasing tendency, particularly on the part of industry, to perform work with non-union labor within their own plants. Outside of industrial plants, where union labor has opportunities to intimidate owners and contractors, the result has been a virtual stoppage of construction work.

We know little about the so-called "Voluntary Codes of Fair Competi-

tion" in Chicago, but Mr. Comstock's appraisal of the practice augurs ill for the industry if it becomes general.

It is apparent to me that if the American Federation of Labor is to maintain its position of supremacy in the construction industry and if it is to prevent very powerful groups of construction men being formed under other union affiliations, its leaders are going to have to recognize that its greatest integrating forces have been the contractors' organizations which have always appeared to be on the opposite side of the fence from the American Federation of Labor. If great construction organizations are permitted to build up within industrial organizations, it will not be long before economic pressure brings them out of the plants and our industry, which is disorganized badly enough at any time, will find itself again engaged in warfare between unions.

My suggestion, therefore, is for you to undertake a compilation of information, similar to that put together by Arthur Comstock, covering industrial building, particularly in the industries where expansion has been within closed gates. I think you will find these large and powerful industries to be building much cheaper now than they did five years ago, as they have become more and more bold in the use of their own labor rather than higher-priced building labor. The vast reduction in the scales they have been paying has more than offset the loss of efficiency in the conduct of their operations. In my own business, I find we are competing more and more with the owners and less and less with other contractors.

Finally, it is obvious there can be no office or large apartment building in this part of the country under conditions pointed out by Mr. Comstock, as it is impossible for such buildings in Chicago to pay any dividends at all.

Leading members of the  
construction industry comment  
on an article by

**ARTHUR F. COMSTOCK**

Formerly chief estimator for  
James Stewart & Co.,  
New York contractor,

Published in

**CONSTRUCTION**  
Methods and Equipment  
last month.

By **ANDREW J. EKEN**

President,  
Starrett Bros. & Eken, Inc.,  
New York, N. Y.

I HAVE READ with a good deal of interest the proof on the article by Arthur F. Comstock and have also asked our chief estimator to check over the statement made as to costs in this article.

So far as I can see, we are in entire agreement with the statements made by Mr. Comstock and we also feel that there are many matters mentioned that are very pertinent and should have public attention. This is particularly so in the matter of the so-called Fair Codes Associations which are being formed at the present time. Our own feeling is that these associations might have an entirely different name from that of Voluntary Codes of Fair Competition and it might well be a shorter and harsher title. It is my own personal opinion that these associations may, at some not too distant date, merit the attention of the proper investigating authorities.

By **A. P. GREENSFELDER**

Fruin-Colnon Contracting Co.,  
St. Louis, Mo.

I HAVE GONE OVER the article by Arthur F. Comstock entitled, "Do Buildings Cost Too Much?", in which he gives an itemized analysis of a 20-story New York skyscraper. This may be all very well, but it deals too much in details and not enough in fundamentals. It is all right to be sarcastic about labor and price fixing, but either Mr. Comstock does not know or he implies too much from hearsay and gossip.

What the construction industry

needs is merchandising just like every other industry. When land prices and money are low, it is a good time to build. This applies particularly when there is only a small amount of vacancies and revising trend of rents.

The problem involves more than the mere consideration of field labor and delivered material prices. We need modernization of design, simplification of practice, sound financing and fair commissions. In fact we need the truth, and nothing but the truth, for all phases of the industry. As, if and when the industry shows enough breadth of vision and broad intelligence to coordinate its activity, then we can solve the needful problems in a fair fashion so as to produce modern buildings at equitable costs.

By **W. G. LUCE**

Vice-President,  
Hegeman-Harris Co.,  
New York, N. Y.

THERE IS one matter which has been forcibly impressed upon me in a building we have just erected and that is the additional cost of shorter hours together with the increased wages. For instance, according to the usual union rules, a man leaves the work shanty at starting time. We figure roughly that 15 min. is consumed in getting started in the morning and in stopping in the evening, with about 15 min. used up in the same process at noon. This, leaving out the question of the noon intermission, means that in an 8-hr. day, there is 1/16 of unproductive time lost. In a 6-hr. day, there is 1/12 lost, or 25 per cent additional.

In the planning of the work, one gang will start at 8 o'clock and quit at 3, disorganizing any other crafts which have to work in conjunction with them and a loss is incurred which cannot be figured in actual dollars and cents. Others start at 9 o'clock and quit at 4, etc., the same process interfering with continuity of work occurring in each of these various shifts and a loss is incurred which is problematical but which anyone watching the operation knows is there.

These various items, added together, make a very sizable addition to the increased wage scale in Mr. Comstock's article and is a very serious item, both in direct cost and in the systematic handling of the



operation. Just what this amounts to I cannot say. Neither do I believe that anyone else can, but it is there just the same.

Again, we find in most of the agreements very small and insignificant items, each one of which, while semi-unimportant, makes its little contribution to the increased cost and increased inefficiency.

I do not agree with the statement that production is satisfactory, but this is another academic question which we know exists and which anyone who has followed the building industry knows occurs and has occurred for the past quarter of a century with each increase in wages.

I do not question your figures as to percentages of increase as I have not made a study of it, but I do believe that the questions I have raised in regard to labor costs are very serious and should be given consideration. Having read the entire article I have no quarrel with the figures as generally set forth, as I presume they are based on actual data. From data I had received, however, I had estimated that the average increase in New York was more than the amount you have shown, perhaps owing to the facts which I have set forth, which simply demoralize a job.

In referring to labor costs, do not overlook the matter of additional expense due to jurisdictional disputes which is also an intangible quantity in so far as expenses are concerned but a very serious item, adding materially to the cost of the whole.

**By COL. HORATIO B. HACKETT**

*President,  
Thompson-Starrett Co., Inc.,  
New York, N. Y.*

**I** BELIEVE that the article written by Arthur F. Comstock covers the cost analysis very well.

I certainly agree with you that we all want to see a resumption of large-scale building construction under conditions that will be fair and equitable to owner, to contractor and to labor. I am afraid that sometimes the country expects the building industry to improve economic conditions when the job is really on the shoulders of others. Too often the contractors are placed in the position of promoters rather than the agency through which well planned projects can be carried out.

I think that we must look to Congress to help the construction industry.

**By WILBUR F. CREIGHTON**

*Foster & Creighton Co.,  
Nashville, Tenn.*

**M**R. COMSTOCK'S article is timely and the data given is very enlightening. It is to be hoped

that it will start discussion and action within the industry to correct the evil.

Too many groups of subcontractors have agreed to raise the wages of their employees in exchange for "protection" in enforcing bidding rules, and other practices started in N.R.A. codes. As Mr. Comstock so ably proves in his article, such agreements have resulted in unreasonable increases in cost of labor on buildings, which the public pays.

Many of these agreements have gone beyond the limit of the law. Just recently, a judge in this city gave punitive and actual damages to an out-of-town subcontractor who unintentionally violated the unknown rules of a local subcontractors' association and who was forced to give up the contract because he could not secure mechanics.

Possibly, if more such cases are taken to the courts or to the Federal Trade Commission, these expensive and troublesome agreements would be abandoned.

**By ROLLAND J. HAMILTON**

*President, American Radiator Co.,  
New York, N. Y.*

**I** HAVE GIVEN a great deal of study to costs of single family dwellings but know practically nothing regarding office building construction or costs.

It does seem to me, however, that no discussion of building costs right now is complete without reference to interest carrying charges. In a very real sense the cost of a building is what it costs to carry it in terms of interest, taxes, maintenance, depreciation, etc. There has been a decided drop in mortgage interest rates under the new Federal Housing Act, especially in terms of a 20-yr. period, inasmuch as mortgages guaranteed under this act are on a long-term amortization basis. It is true that the Federal Housing Act does not apply to office buildings. There is, nevertheless, a great significance in the current trend toward an investment status for housing and one which should have a reflex with respect to all other classes of buildings.

**By JOHN GRIFFITHS**

*John Griffiths & Son  
Construction Co.,  
Chicago, Ill.*

**W**E HAVE read Mr. Comstock's article and subscribe to his contention that the high price of material and labor at this time is no doubt handicapping the construction industry.

However, we believe that this applies more particularly to materials than labor in this locality. It is our feeling that while mechanics' wages in the building industry seem high to the owner, some allowance should be made for the lack of regular em-

ployment, and the fact that the building mechanic holds himself available for employment during long periods in which he finds very little employment.

**By H. K. FERGUSON**

*President, The H. K. Ferguson Co.,  
Cleveland, Ohio*

**I** HAVE READ with considerable interest Mr. Comstock's article. While it covers only a small area of the country, it does cover a very considerable volume of business, and an area in which we are always interested.

Our own experience has been that while prices advanced materially in 1937 to a new high level for both building materials and factory machinery, we have already experienced a considerable falling off in 1938 prices in almost all of the lines in which we are interested.

Our own difficulty in carrying out the suggestions made by Mr. Comstock is that our customers never back up the efforts of ourselves, or any other engineering contractor, in their interests. They are always too obsessed with the necessity for quick occupancy, under pressure, to warrant long arguments with labor or material men.

I am also somewhat disinclined to agree with Mr. Comstock in his opinions as to the hourly output per individual. It is my firm belief that the present government policy of WPA and other government operations is gradually destroying the morale of labor with regard to output, as built up carefully by conscientious contractors over a long period of years. The constant emphasis on the fact that the United States owes three meals a day, good living quarters, and a loafer's existence to anyone who does not want to work, at the expense of those who do, cannot help but have a detrimental effect on all concerned.

**By J. W. COWPER**

*President, John W. Cowper Co.,  
Buffalo, N. Y.*

**I** AGREE GENERALLY with what Mr. Comstock has to say regarding building costs and believe that buildings, under present conditions, do not cost too much. We hear a great deal of the high wages. The hourly rates are high, but when we consider the time put in by the average employee in construction the annual wage is not high.

Why are wages high? Because, largely, of Government rules and regulations and the tendency of Governmental departments continually to set up in contracts high wages which not only affect Government work but set the pace in all work. One of the most terrible things in the line of high wages has been those rates es-

tablished for the Board of Water Supply of New York City's new Delaware River aqueduct work. These are not only excessively high, but provide for unnecessary employment.

Another contributing factor to the high cost of construction is the enormous taxes, national, state, and local, assessed against contractors, which must be charged directly to the cost of work. Among these are the New York State unemployment tax, the Federal social security and unemployment insurance, both of which exact a large toll, especially when multiplied all the way down the line to the production of natural resources.

Of course, the small volume of business adds to the burden, or overhead, and increases the cost of work. The small volume is, in my opinion, very largely due to the attitude of the Government and its general policy towards business, which is keeping investment money out of the business field and particularly, construction.

**By S. M. SIESEL**

*President, Siesel Construction Co.,  
Milwaukee, Wis.*

**I** THINK Mr. Comstock's article is very well prepared and gives pertinent information on the cost of an office building of this size.

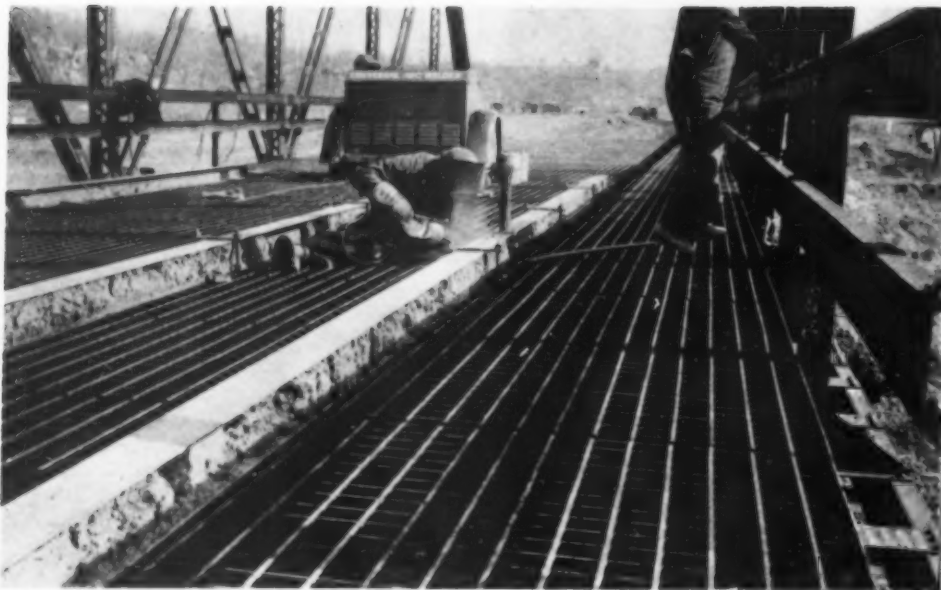
I do, however, believe that that part of the article under the caption, "Voluntary Codes of Fair Competition" and the material which follows, should not be included in an article under the caption, "Do Buildings Cost Too Much?". It is in the nature of an exposé of conditions existing in the industry which are a result of recent political action which has forced on the contracting industry many burdens which, in the writer's opinion, will not be permanent, and which only tend to confuse the prospective investor. They should be dealt with separately and, in my opinion, it is the duty of the contracting fraternity to clean up these conditions as promptly as possible.

**By C. P. WOOD**

*Lockwood Greene Engineers, Inc.,  
New York, N. Y.*

**W**E HAVE looked over Mr. Comstock's article and have found it very interesting. It is an intelligent presentation of the subject of the cost of buildings and should tend to allay the fear of going ahead with building projects.

You will understand that Mr. Comstock's comparisons depend somewhat on the dates which he has selected for computing his costs and that renewed activity in building construction, under present conditions, might cause a considerable increase above the costs noted for the current period.



**PRying DOWN** of Tri-Lok steel grid for bridge floor over Blue River on Route 21 in Jackson County, Mo., assures full contact for welding by crew of O'Dell Construction Co., of Hannibal, Mo. H-sections are bolted down through steel floor to stringers, steel floor is pulled down by worker standing on end of bar lever and held until weld to stringer is made. — Photo from D. C. WOLFE, Sverdrup & Parcel, consulting engineers, St. Louis, Mo.

## How They Did It

### CONSTRUCTION DETAILS *For* *Superintendents and Foremen*

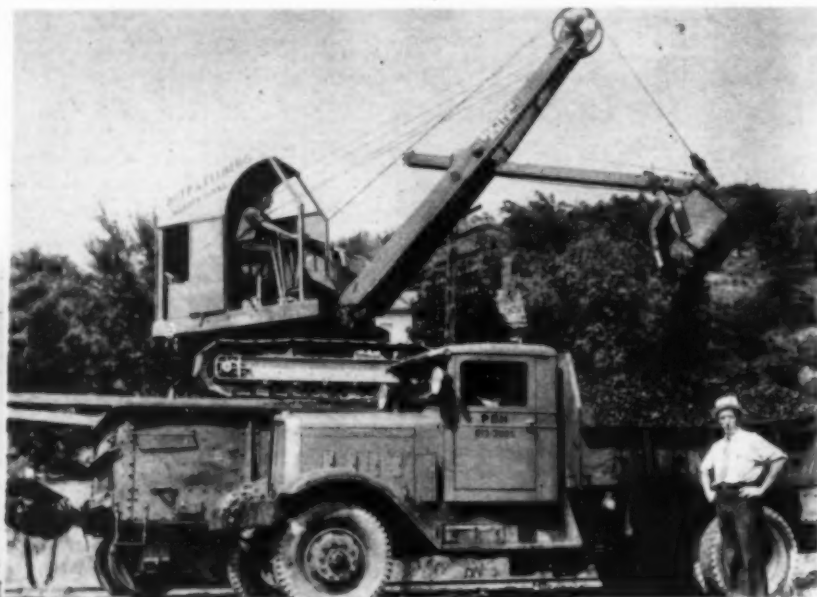


**SHEETPILE EXTRACTOR** on cofferdam for Allegheny River Lock and Dam No. 9, in Pittsburgh district of U. S. Engineer Department, consists of A-frame, designed for 200-ton stress, pivoted to end of boom of Lorain crawler crane with 10-part line exerting pull of 150 to 200 tons on sheetpiling 50 ft. long. All compression load is taken by A-frame. After piling is "started" by A-frame rig, it is pulled through remainder of interlock with standard steam extractor. — Photo from G. C. HERTWECK, York Engineering & Construction Co., Rimer, Pa.

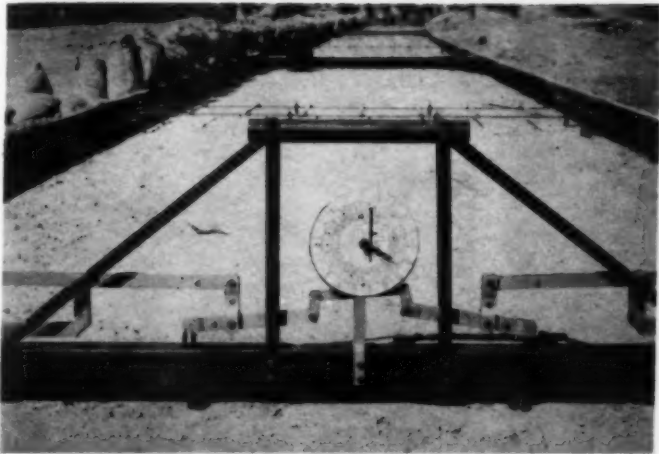
**UNLOADING (right)** of railway gondola cars carrying Amiesite mixture for black-top paving is done by  $\frac{3}{4}$ -yd. Bucyrus-Erie power shovel operating on a plank runway across car top. Machine owned by Duff & Ellberg, of Warren, Pa., handles 6 cars (containing from 55 to 60 tons of material) in 10-hr. day.



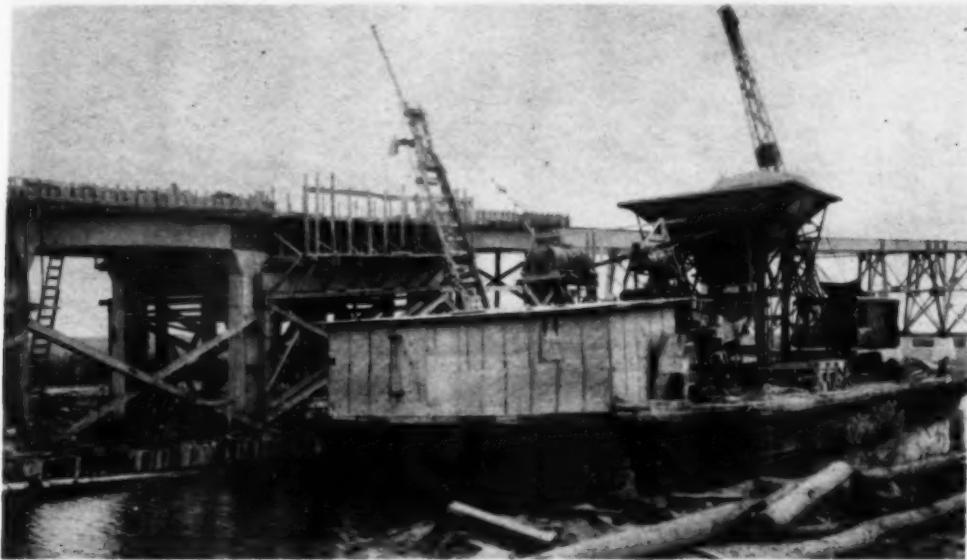
**PIPE-HANDLING RIG. (left)** consisting of steel truss hanging from crane hook, is used at plant of Chicago Bridge & Iron Co. to load 48-ft. lengths of 60-in.-diameter welded steel pipe for new industrial water supply system for Birmingham, Ala., involving total of 39 mi. of steel pipe in diameters from 60 to 42 in.







**VOLUMETER (left)** for measuring volume of concrete pavement has been devised by C. N. Wilczek of California Division of Highways. On beam spanning subgrade, system of compound levers, actuated by six "feet," (in form of automobile valve stems) resting on subgrade, actuate indicator on dial graduated to read directly the volume of concrete per 25-ft. length of pavement corresponding to depths at point of measurement. With this device one man can determine volume contained in  $\frac{1}{2}$  mi. of subgrade in 1 hr. and actually measure it every 25 ft.

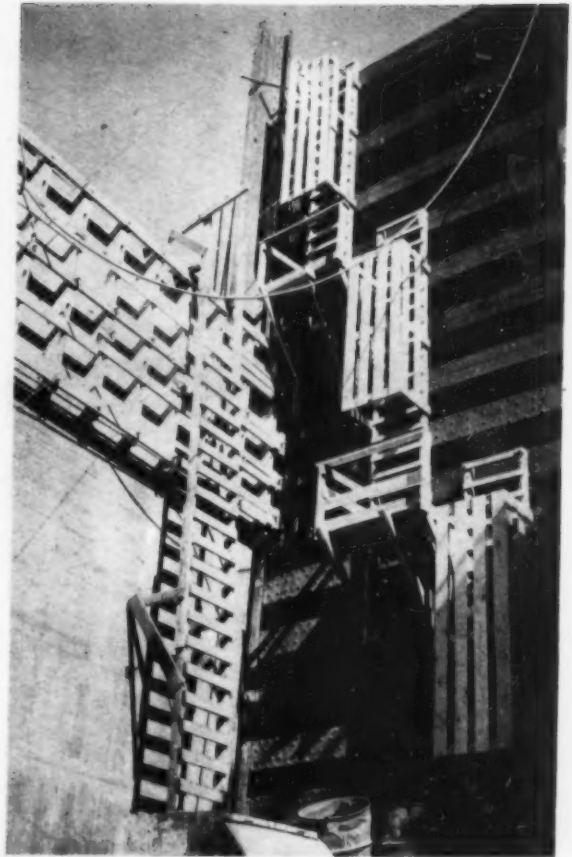


**FLOATING MIXING PLANT** traveling in construction canal alongside Neches River bridge, Port Arthur, Tex., delivers concrete through pipe line of Pumpcrete unit to concrete girder spans at lower end of long approach. Note pipe line supported by ladder boom. Pumpcrete plant later is transferred to deck to place roadway slab on steel spans. Taylor-Fichter Steel Construction Co., superstructure contractor.



**CROSS-OVER ARROWS**, painted on Nevada highways, indicate to motorists points beyond which passing over double traffic guide line is allowed.

**REMOVAL OF UPROOTED TREES, (right)** following floods and storms is accomplished readily with LeTourneau tractor crane operated by Caterpillar tractor in Sacramento, Calif.



**SAFETY LADDERS**, with stage platforms and protective inclosures, are placed on huge 50x50-ft. steel gates being installed along crest of U. S. Bureau of Reclamation's Parker dam, being built across Colorado River to provide intake to Colorado River aqueduct project of Metropolitan Water District of Southern California. Dam is being built by J. F. Shea Co., Inc., as subcontractor for Six Companies Inc., with Frank T. Crowe as general superintendent.

### WANTED — Photos of Details

The Editor of Construction Methods and Equipment wants photographs or sketches illustrating interesting **DETAILS** of method or equipment and will pay for those he finds acceptable for publication.

Hasn't your job produced some **DETAIL** that might be illustrated on this page? Send along a picture of it; we'll return it promptly if we can't use it.

# FROM CLEARING TO

Down go clearing costs as this LO, equipped with bulldozer and Carco winch, pulls out big stumps and trees at Port Angeles, Wash. Once the clearing is done, drawbar, winch and bulldozer are ready for hauling, hoisting, etc.

(Below) Here a New York contractor uses a Hough loader mounted on a Model M for loading topsoil—120 3 1/2-yard loads in 8 hours. A handy, low-cost outfit for digging basements, cleaning ditches, sloping banks, backfilling, etc.



KNOW YOUR FULL COSTS—CHECK THESE IMPORTANT POINTS AGAINST YOUR PRESENT EQUIPMENT

- INITIAL COST
- WORKING SPEEDS
- UPKEEP COST
- TIME LOSSES FOR REPAIRS
- STARTING TIME
- COST OF FUEL PER GALLON
- COST OF LUBRICATING OIL
- WORKING LIFE
- TRADE-IN VALUE

All these enter into your cost per yard. If you use Allen-Chalmers equipment it will be low enough to enable you to consistently win job awards and keep profitably busy.

LO's and Gar Wood scrapers cut accurately and spread evenly, thus reduce finishing time on this Mississippi highway job . . . and going or coming the LO's gain extra trips by moving faster in the cut, on the fill and traveling.

(Right) Backfilling around culverts and over embankments is easy when you use an L and Continental scraper, as this Iowa contractor does. No extra equipment needed—the scraper picks up the load in the cut, backfills it where needed.





# TO FINISHING... CUT YOUR JOB COSTS WITH *Faster Power*

Gain on item after item--from initial clearing to final blading--by using faster moving Allis-Chalmers equipment. With A-C tractors you get plenty of reserve power for tearing out stumps and rocks, for loading big-capacity scrapers in tough going, and for quick grade climbing. Instant starting, quick pick-up, more and higher speeds, easier handling--in short, **FASTER POWER**, *bring you increased yardage estimates and greater profits at the month's end.* With Speed Patrols, you get more effective blade pressure and extreme accuracy together with greater speed for finishing work. And lower costs from clearing to finishing. Figure to win and *keep profitably busy* by using **FASTER POWER**

SEE YOUR  
ALLIS-CHALMERS  
DEALER..

GASOLINE AND CONTROLLED IGNITION OIL TRACK-TYPE TRACTORS FROM 32 TO 80 DRAWBAR H. P. . . TANDEM AND SINGLE DRIVE SPEED PATROLS . . DRAWN BLADE GRADERS . . INDUSTRIAL WHEEL TRACTORS . . STATIONARY POWER UNITS FROM 31 TO 102 BRAKE H. P. . . TWO, FOUR AND SIX-WHEEL SCRAPERS, BULLDOZERS, TRAILBUILDERS, LOADERS, WINCHES AND OTHER ALLIED EQUIPMENT



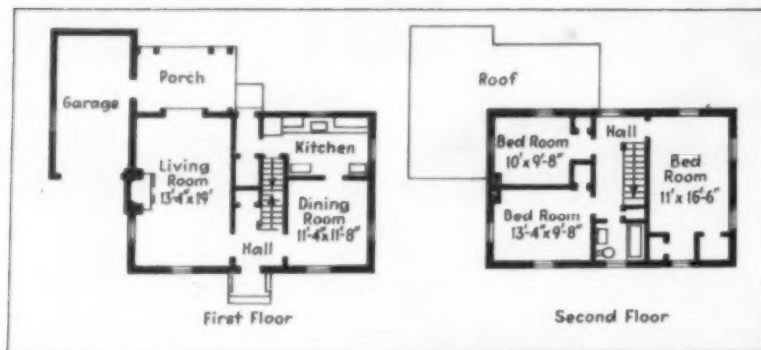
More effective blade pressure and correct speeds (from 2.3 to 16 M.P.H.) for every job--ditching, finishing, oil mixing, scarifying, traveling--make the Speed Patrol the choice of this Wisconsin contractor.

# ALLIS-CHALMERS

TRACTOR DIVISION—MILWAUKEE, U. S. A.

# SMALL HOUSES

## Built According to Strict Standards



**W**ESTHAVEN, a real estate development that exhibits a rare combination of good taste and sound construction in homes of the \$9,000-\$10,000 class, early in its existence received from the Washington, D.C., Board of Trade a first award of merit for architectural and structural excellence. The community, established by the Westhaven Development Corp., utilizes the natural advantages of a hilly, wooded site along Massachusetts Ave., in Maryland, 1/2 mi. beyond the District line. Into this location the architects have fitted houses of pleasing exterior appearance and efficient interior arrangement, incorporating in the structures sound, modern materials and principles of construction. Architecturally the houses offer pleasing variations of authentic, tested designs and carefully avoid any



**CENTER-HALL HOUSE** (above) of attractive design and economical room arrangement (inset) is set among slender oaks.

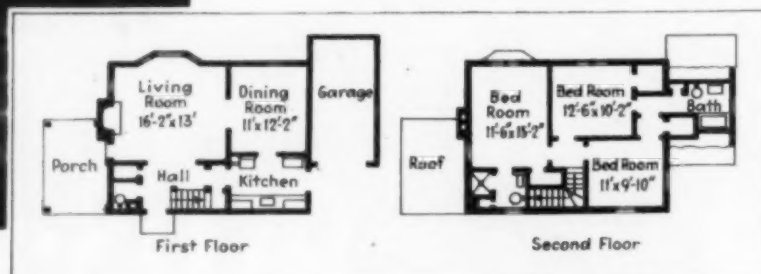
straining for exaggerated or novel effects. The combination of good architecture and sound construction has produced prompt sales of all completed houses and many orders for homes in advance of construction.

*Citation*—Accompanying the award to Westhaven as the most attractive local development in three years, the following citation was reproduced in *The Bulletin* of the Washington Board of Trade. The award was based on the first group of six houses erected in the tract. Several dozen additional houses have since been constructed.

"Westhaven Development Corp., owner and builder, group of six houses, 5500 block of Worthington Drive; Schreier & Patterson, architects.



**GOOD LAYOUT** (inset) provides two baths and lavatory in small house of pleasing appearance.



**FOUNDATION WALLS** of 8-in. cinder block are built up on concrete footings. Truck mixers deliver concrete.

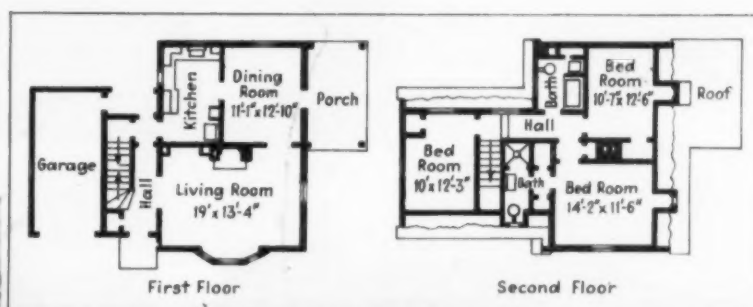
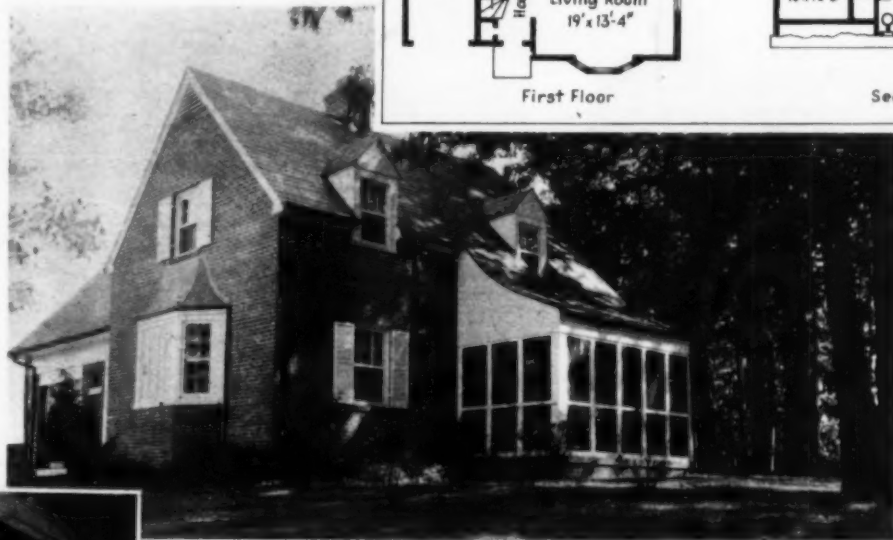




**THREE EXAMPLES** of good architecture in \$9,000—\$10,000 houses, two having solid brick masonry walls and third a combination of stone and clapboard on wood frame.

"In view of the fact that these houses were all designed as parts of a definite scheme of development by the same architects, they were considered by the jury as a group. Considered as a group they show pleasing variations of the same fundamental plan, and the houses, while preserving their individuality, give an impression of studied relationships within the group. The worst examples of American architecture are customarily found in the design of our small detached houses, and it is refreshing to find an example in which houses of this size have been executed by architects who have achieved an excellent result by the exercise of care and restraint in design instead of resorting to the cheap flashiness usually found in this sort of work."

Some conception of the architectural standards is given by accompanying photographs and floor plans. Construction of the houses is carried out by the Westhaven Development Corp., Albert W. Walker, president,



**VARIETY IN ROOF LINES** (left) lends interest to well-planned house (inset) with two baths.



**ROCK WOOL INSULATION** (left) 4 in. thick is installed in all frame sidewalls and above all second floor ceilings.

with work in the various mechanical trades subcontracted to local tradesmen. The properties, complete with grading, planting and all utilities, are priced to sell from \$9,250 to \$9,950. Lots are 65 ft. front and 100 ft. deep (113 ft. including park strip inside curb). All houses contain three bedrooms and 1½ to 2½ bathrooms (the half-bathroom being a lavatory). Each basement is fitted with a pine-paneled game room and a toilet.

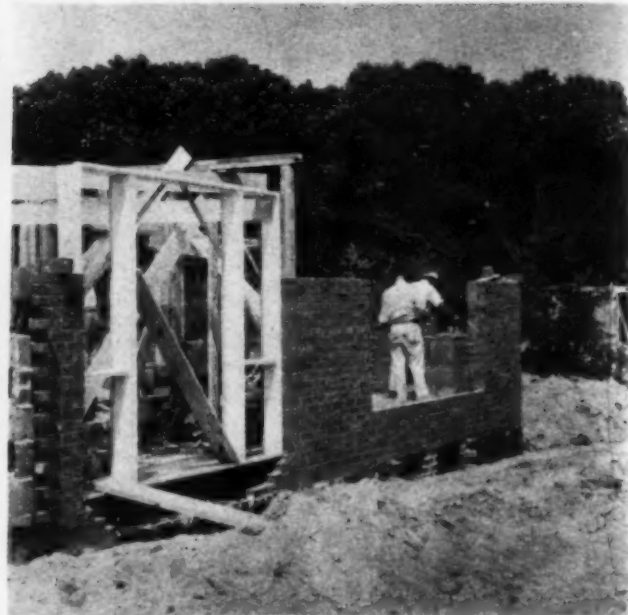
**Construction Standards**—All houses are constructed with strict adherence to the following standards:

- (1) Foundation walls, waterproofing, drains, cellar floors, interior basement finish.  
Foundation walls 8-in. cinder block with two coats of cement and ironite parging—3-in. drain

tile on the edge of and level with the footings—4-in. concrete cellar floor, walls whitewashed in laundry, asphalt waterproofing, furring and pine paneling in recreation room.

- (2) Superstructure — walls, floor framing, partitions.  
Masonry walls with interior asphalt waterproofing and ¾-in. furring—2x10-in. white pine joists under subfloor—4-in. inside partitions.
- (3) Insulation of walls and roof.  
Rock-wool insulation 4-in. thick in all frame sidewalls and above all second floor ceilings.
- (4) Roofing and sheet metal.  
Slate roof with copper flashing, gutters and down-spouts.

- (5) Plastering and lath.  
Wood lath throughout, two-coats of plaster—ceiling in recreation room sand finish.
- (6) Windows and screens.  
Wood frame double-hung sash, half bronze screens.
- (7) Doors and floors.  
White pine doors veneered with gum, clear red oak floors, linoleum in kitchen.
- (8) Tile floors and walls.  
Tile floors and walls 4 ft. high in bathrooms—6 ft. high around tubs.
- (9) Plumbing.  
Copper hot and cold water pipes, cast-iron sewer stacks—standard fixtures.
- (10) Heating and radiators.  
Automatic hot-water heat and concealed radiation.
- (11) Electric wiring and conduits.  
BX flexible cable with 1/2-in. rigid conduit in cellar.



**SOLID MASONRY WALLS** are typical of house construction in District of Columbia and Atlantic seaboard cities.

**CORNERS OF WOOD LATH** (left) are reinforced with metal corner beads. One lath has been removed to expose rock wool insulation between wood studs of dormer.



**COMBINATION** of solid masonry and timber frame wall permits variety in exterior treatment.



**POWER SHOVEL** begins street grading into tract having splendid stand of oak and other trees.



**GROUPS OF HOUSES** are erected simultaneously. First group on tract comprised six houses.

- (12) Exterior painting; interior hardwood and enamel finish; hardwood floor finish.

Three coats of outside paint; inside: (1) first coat flat paint, (2) second coat half flat and half enamel, (3) third coat enamel. Floors scraped, given three coats of white shellac and then waxed.

- (13) Papering and painting of plastered walls.

All rooms papered except baths and kitchens, which have three coats of enamel paint.

- (14) Trimming hardware.

Colonial brass hardware, chromium in baths and kitchen.

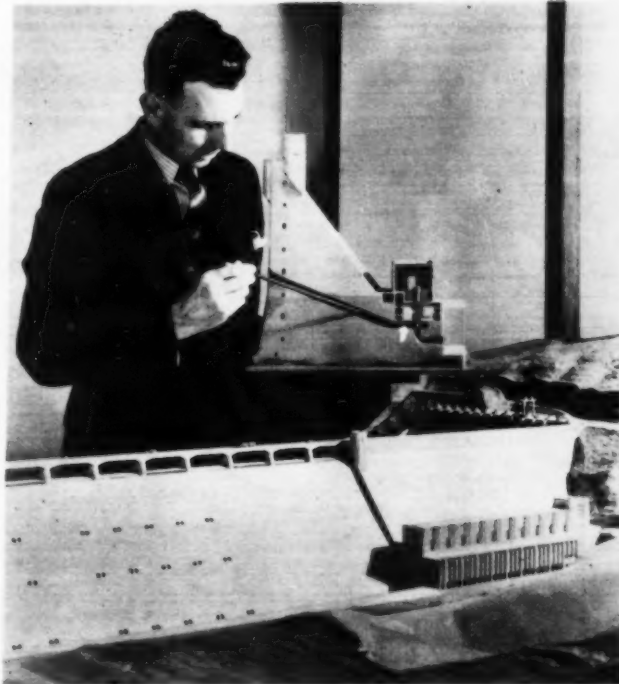
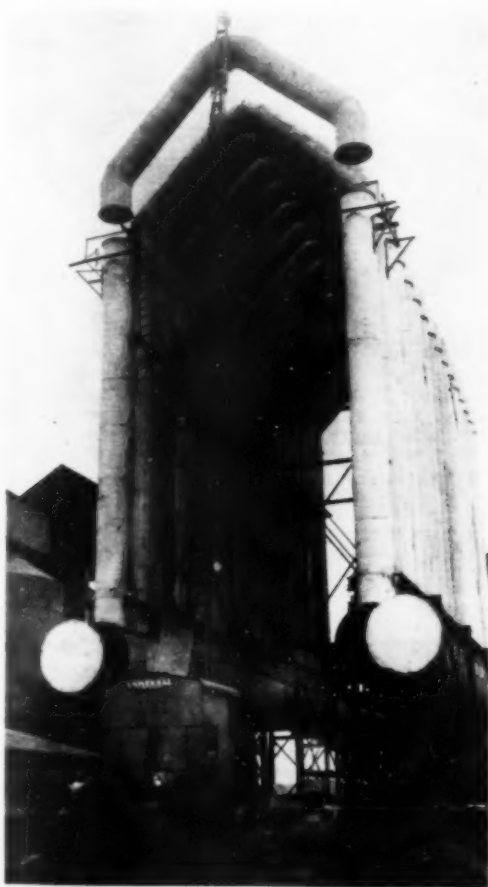


# JOB ODDITIES

A MONTHLY

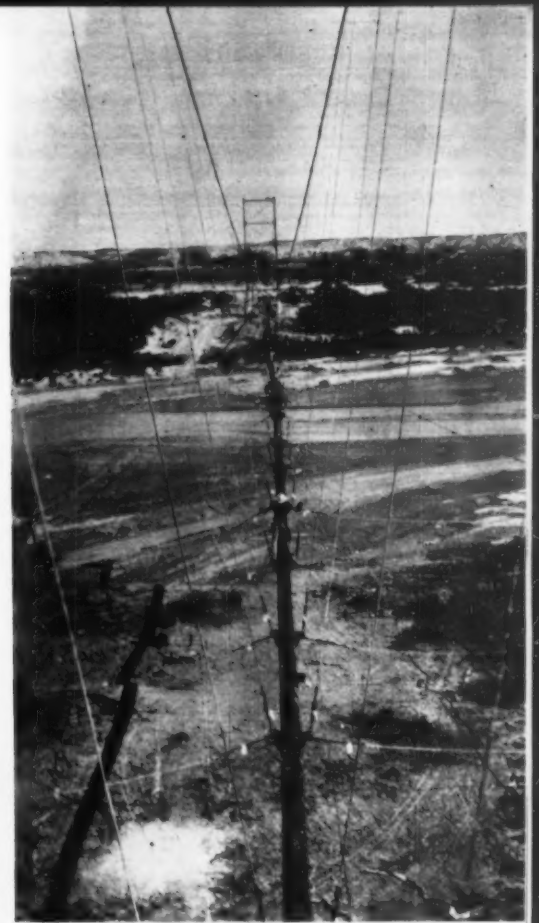
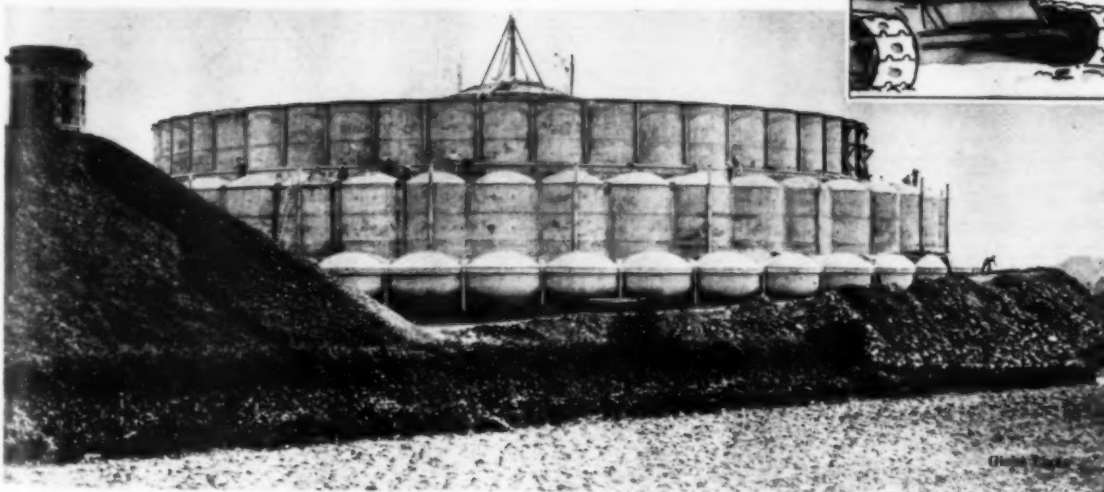
PAGE OF

*Unusual Features  
of Construction*



**MODEL** prepared by U. S. Bureau of Reclamation demonstrates working of Grand Coulee dam on Columbia River in Washington. Above dark-colored section (to which operator is pointing), representing part of dam already completed, a 300-ft. mass of concrete is to be added by Consolidated Builders, Inc., under \$34,442,240 contract.

**LONG REACH** (left) for setting 38-in. diameter flues, extending to height of 76 ft. at plant of chemical company in Pittsburgh district, is attained by equipping Universal truck-crane with 80-ft. welded boom, designed and fabricated by contractor. Is this 80-ft. boom a record length for a truck-mounted crane? — Photo from J. F. MINOTTE, Minotte Bros. Co., steel erection contractor, Pittsburgh, Pa.



**PIPE SUSPENSION BRIDGE** crosses river at Benson, Ariz., with 1,000-ft. span between 85-ft. steel towers. Unusual structure for El Paso Natural Gas Co. carries Lindewelded pipe, 12 3/4 in. in diameter, in saddles guyed by wire rope from main cables. Strings of oxy-acetylene-welded pipe were hauled from each side toward center of span and joined by tie-in weld at mid-point of crossing.



"Aw'right, Fresh Guy!"

**FRENCH STYLES** (left) in reservoirs. Unusual design of three-story concrete structure recently completed at Nantes. Diameter is 213 ft. and height about 50 ft.

# DAM BUILDERS

Construction Engineers on U. S. Bureau of Reclamation Projects



**E. A. MORITZ**, formerly in charge at Parker dam, in California, is now directing operations for U. S. Bureau of Reclamation at Marshall Ford dam on Colorado River project in Texas.



**H. P. BUNGER** is now construction engineer for U. S. Bureau of Reclamation at Parker dam, in California, after transfer from Marshall Ford dam, in Texas.



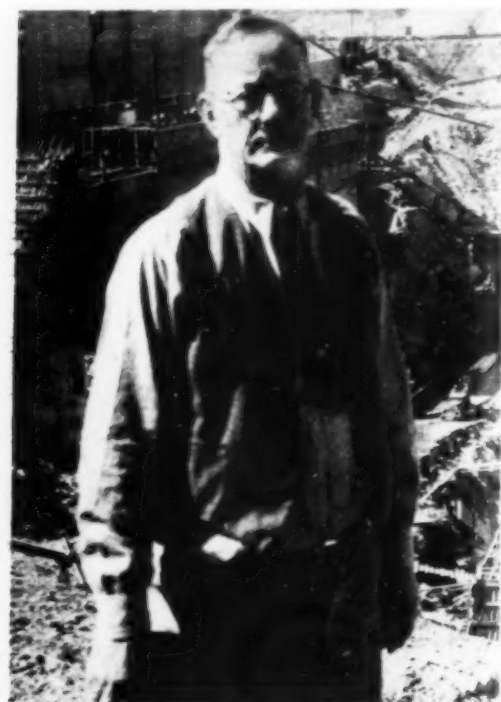
**LEO J. FOSTER** (left) construction engineer for All-American Canal and Gila projects of U. S. Bureau of Reclamation, with headquarters at Yuma, Ariz., inspects Imperial dam with **JOHN K. ROHRER**, resident engineer. Mr. Foster succeeded R. B. Williams, recently promoted to Assistant Commissioner of the U. S. Bureau of Reclamation.



**S. F. CRECELIUS** is construction engineer in charge of Caballo dam in New Mexico, part of the Rio Grande project of the U. S. Bureau of Reclamation.

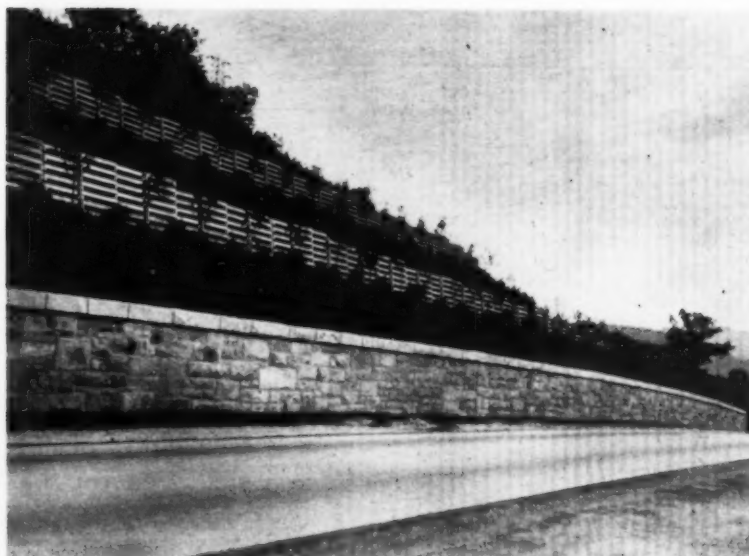


**W. W. BAKER** is construction engineer of U. S. Bureau of Reclamation at Alamogordo dam, with headquarters in Fort Sumner, N. M.



**E. C. KOPPEN** is in charge of construction of Bartlett dam on Verde River, part of U. S. Bureau of Reclamation's Salt River project in Arizona. Bartlett dam will be world's highest—290 ft.—multiple-arch dam.





**ROADSIDE IMPROVEMENT** showing slope at Palmer before and after treatment involving masonry retaining wall, planting and crib construction to prevent soil erosion.

# Modern Maintenance Methods

## *Insure Massachusetts' Investment in State Highways*

(From a paper presented at the convention of the Association of Highway Officials of North Atlantic States.)

By JAMES E. LAWRENCE

Maintenance Engineer, Massachusetts Dept. of Public Works

**T**HE DEVELOPMENT of the study of soil stabilization and the proper mixture of available materials to produce maximum density has contributed much to the improvement of road surfaces, especially on secondary roads. With the aid of stabilizing agents, such as calcium chloride, rock salt, asphalt emulsion, cement, tar and even waste liquor from paper mills, stabilized surfaces are developed which are efficient both in durability and load bearing capacity.

The problem of soil stabilization is not a difficult one in Massachusetts as an abundant supply of good road gravel is available in most sections of the state. A subgrade of this material, varying from 6 to 12 in., is constructed under all hard-surfaced roads except on Cape Cod,

where the natural soil is very sandy. In that section loam hardening is added to the sand in order that the soil may be properly compacted and stabilized. On most secondary roads which are not hard-surfaced the wearing surface is composed of gravel 6 to 12 in. in depth which is stabil-

ized by surface treatments of asphalt emulsions and tars.

Rough and uneven surfaces sometimes develop across wet areas, due to saturation of the subgrade caused by capillary action. This problem has been solved satisfactorily by applying a bituminous treatment to the fill

mudjack, a water cart, a small truck, operators for the compressor and mudjack, and about five laborers. The mudjack is a large portable motor-operated pump which forces a mixture of loam, cement and water into the subgrade through a hose and nozzle at a pressure of from 350 to 400 lb. per square inch through holes drilled in the concrete.

**Surface Treatments** — The application of surface treatments to all types of roadway, both for the preservation of the surface and the provision of non-skid qualities, forms a major part of our maintenance work during the seasons when this work may be done. Methods and bituminous material used in this work vary somewhat in different localities. Recognized authorities on bituminous products have established approximately 25 specifications for asphaltic materials and 14 for tar products. It is practically impossible for all engineers who plan and supervise the use of these materials to become familiar with the qualities of each in order to make the proper selection. It is uneconomical, also, for producers of these materials to store an adequate supply of all grades at their storage plants in order that they may be tested and available for use at all times. In order to overcome this difficulty a plan is being considered to confine our needs to a relatively few specifications for these materials.

It is desirable that all surface treatments provide non-skid surfaces. Considerable difficulty has been experienced in this work on cement and bituminous concrete roads where fast and heavy traffic wears away or loosens



**POWER LAWN MOWER** cuts grass in dividing strip of superhighway.

beneath the subgrade, thus preventing the water from entering the subgrade.

When settlements occur in cement concrete pavements which are otherwise in good condition, it is more economical to jack up the slab to the proper grade than to replace it with a new section. This may be accomplished by the process known as mudjacking. The equipment and labor needed for this work consist of a



**MUDJACK** pumps mixture of loam, cement and water through drilled holes in concrete pavement to raise settled slab to proper grade.



**GENERAL APPEARANCE** of Worcester turnpike at Wellesley is improved by planting of trees and shrubs and regular mowing of grass-covered dividing strips.

the mineral aggregate within a short time, leaving a dangerous, slippery bituminous surface. A method of treatment which indicates that this difficulty may be overcome is by pre-coating the concrete and stone aggregate with a primer or penetrating oil previous to the application of the bituminous material. When this oil is applied to concrete surfaces it causes the bituminous material, when applied to the surface, to flow into the small pores in the concrete, thereby anchoring the bituminous material to the concrete. The application of this primer to the stone acts as a cleaner and also allows the bituminous material to penetrate the small interstices in the stone and therefore create a better bond. It is absolutely essential, if this work is to be successful, that the bituminous material adhere to the pavement for an indefinite period and that the stone covering adhere to the bituminous material. An application of  $\frac{1}{4}$  gal. of 50-60 penetration asphalt per square yard on heavy traveled roads, with a covering of  $\frac{3}{4}$ -in. stone, provides a satisfactory non-skid surface when a primer is used.

On light traveled concrete or bituminous macadam roads a non-skid surface may be obtained by applying from  $\frac{1}{5}$  to  $\frac{1}{4}$  gal. of 85 per cent asphaltic road oil with a covering of  $\frac{3}{4}$ -in. stone, using approximately 50 lb. per square yard.

Excellent results are obtained with retread surfacing on light traveled bituminous roadways where the pavement thickness is not less than 2 in.

Roadways which have a weak surface texture but a fairly good foundation may be satisfactorily resurfaced with cold-mix bituminous material. This material is rapidly coming into greater favor, as any grade of roughness may be obtained by varying the size of the aggregate. The material may be brought from the plant and stock-piled, if necessary, for several days before it is used, without losing any of its qualities or workability.

**Joint Filler** — An ideal joint filler for cement concrete pavement would be one which could be poured into a cavity without priming and would develop suitable adhesion to the concrete faces without being too dense to compress easily. Rubber latex has been combined with many materials, such as cork, sponge rubber, puffed wheat, mica powder and asphalts, but none of these is entirely satisfactory. It is believed, however, that the principal involved is correct and that this type of material will be perfected within a short time.

**Shoulders, Gutters and Slopes** — The maintenance of unhardened shoulders constitutes a major item of expense and requires almost constant attention on heavily traveled routes, as it is necessary that they be brought up to grade by adding

cur, on curves, in residential sections, and on heavily traveled roads. Sections where car tracks have been abandoned and removed should also be widened and hardened. Gutters and shallow ditches may be eliminated in cut sections where the shoulders have been hardened to the bottom of the slope. The shoulder may be hardened with the surface and sub-base of the same design as the pavement section, but in the case of cement concrete roads it is often more convenient to make the widening of bituminous macadam or bituminous concrete, as this material is better suited for this type of work. A base course consisting of 4 in. of broken stone and a 2-in. surface of bituminous concrete makes a very satisfactory shoulder.

A serious problem that should be



**NON-SKID SURFACE** of bituminous pavement shows rough texture produced by pea stone covering.

new gravel about once a year, treated with road oil to lay the dust, and dragged sometimes as often as once a week. Soft shoulders also constitute a potential accident hazard. It is, therefore, evident that a program of maintenance betterments should include the work of hardening and widening shoulders, with preference being given to sections on steep grades where erosion is likely to oc-

given due consideration is that of providing places where cars may park off the traveled way. Parking areas with hardened surfaces should be provided at regular intervals to relieve this condition.

Deep ditches parallel with the roadway are rapidly being eliminated by the construction of underground drainage systems. Slopes in fill sections are being flattened wherever this is practical in order to eliminate guard rail and decrease the hazard to vehicles leaving the roadway.

Soil erosion in cut sections is being materially reduced by flattening the slopes, seeding, sodding and planting trees. In some instances where slides occurred in deep cut sections during heavy rain storms, the slopes were flattened, sodded and terraced, and underdrains were installed to intercept the ground water which is the real contributory cause to a slide. Thus the surface water was slowed up to such an extent that surface erosion was prevented, and the underground water confined to a safe channel.

**Guard Rail** — The replacement of wooden guard rail in open country, and especially at dangerous locations, with newer types, such as cables, tapes, and steel plates which have strength, resilience and a tendency to deflect vehicles, should be considered of vital importance in reducing injuries to motorists and should be included in the betterment program of maintenance work.

**Sidewalk Construction** — In 1935 the Legislature in Massachusetts authorized the Department of Public Works to construct sidewalks along state highways and also authorized a bond issue to cover the cost of construction. To date, approximately 500 mi. of sidewalks have been constructed. (See *CONSTRUCTION Methods and Equipment*, January, 1937, pp. 64-66.)

**Roadside Maintenance** — Modern superhighways have necessitated a change in methods and equipment used in maintaining roadsides. Wide strips of grass between divided roadways and narrow strips between sidewalks and curbs must be mowed



**WINTER MAINTENANCE** is organized to get snow plows and other equipment out on the highways within one hour after unfavorable conditions develop.



regularly if the beauty of the roadside is to be maintained. Slopes in both cut-and-fill sections which were formerly left with the subsoil exposed are now loamed, and seeded or sodded, and these also must be mowed. Today, motor mowers have in many cases replaced horse-drawn equipment, as they are capable of mowing slopes and irregular areas which could not be mowed otherwise. Planting of trees and shrubs for beautification and the prevention of erosion has an important place in maintenance and betterment work.

**Winter Maintenance** — The speed with which winter maintenance can be accomplished is of most importance, and the personnel and equipment used on snow removal and ice control must be organized in such a manner that this work may be started within an hour after unfavorable conditions develop. The four-wheel-drive snow removal unit has replaced the slow moving tractor plows where speed is required. These modern units have sufficient traction and are capable of attaining speeds of 35 to 40 mi. an hour. They are equipped with interchangeable plows — "V" and one-way — which enable them to be used as patrol units or emergency units. They are also equipped with special electrical systems, air brakes, mechanical sand spreaders, hydraulic steering and special hydraulic systems to operate the plow and wing.

Each fall, the operators of snow removal equipment are required to attend a school where they are instructed how to operate and care for these units. This equipment is stored in garages adjacent to the highways on which it is used, and provision is being made to provide storage space for this equipment in the abutments of new bridges which are being constructed in conjunction with the elimination of grade crossings, etc.

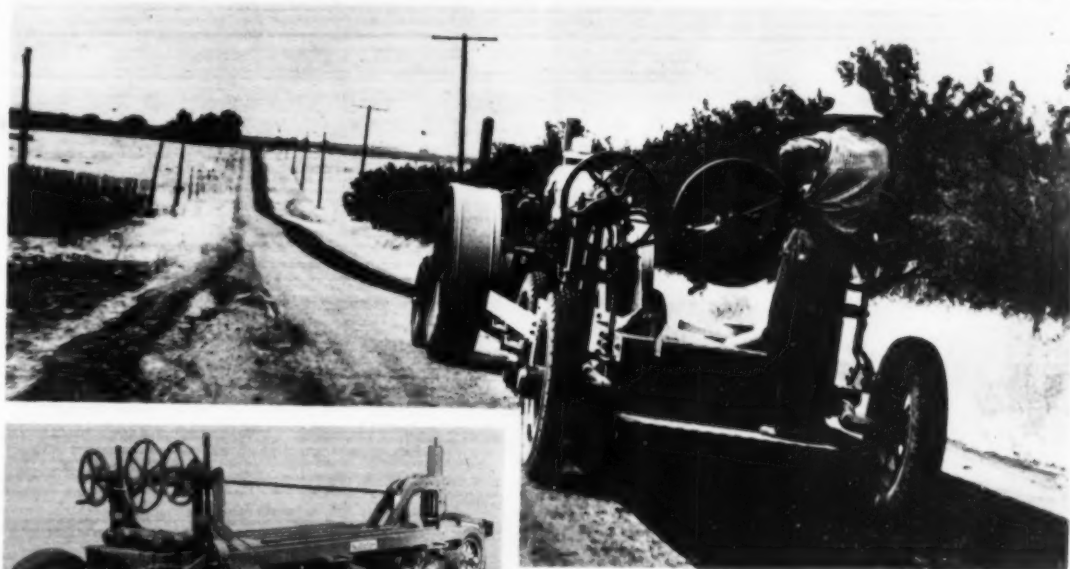
Abrasives used in ice control are chemically treated with calcium chloride or sodium chloride and consist of clean, coarse, sharp, screened sand or washed stone screenings with a maximum size of  $\frac{1}{2}$  in. Washed sand is used whenever it is readily obtainable, and this material is procured direct from commercial plants as required for use on the roads, this method having proved more efficient and economical than stockpiling along the highways.



# OLD ROADS

## REJUVENATED

with **KILLEFER ROAD PLANERS**



### save MONEY & LABOR

With a Killefer Road Planer, old corrugated asphalt macadam ROADS CAN BE MADE SMOOTH AGAIN. The Killefer Road Planer cuts and trims high spots to a uniform level. Cuttings can be used for patching, for extending road shoulders, or for new road surfaces. ADD TO THE LIFE OF YOUR ROADS with a minimum of expense. Labor costs are small for only two men are required.

### save TRAFFIC DELAYS

**ROAD CLOSED**  
NO ROAD OR STREET IS CLOSED while Killefer Planers are at work. There are no traffic delays for traffic can use every part of the old or reconditioned road without danger to the traffic or damage to the refinished surface.

### SKID PROOF ROADS

Nothing remains of the humps but little parallel lines 1" apart on the flat surface of the reconditioned road. This makes an effective skid proof surface in wet or dry weather. The Killefer Road Planer can also be used effectively to cut ice from road surfaces in the winter season.

## WE SAY . . .

### testimonials

SEE YOUR NEAREST  
CATERPILLAR" DEALER

# KILLEFER

PEORIA, ILLINOIS

MANUFACTURING  
CORPORATION

LOS ANGELES, CALIFORNIA

"We reconditioned 54 blocks with a Killefer Road Planer at a savings of \$18,000. Sixty-five minutes were required for a block 36' wide and 500' long."

"The salvage of the surface asphalt that is removed will almost equal the cost of operation."

"At a cost of \$100 per year our 16-year-old Killefer Road Planer has kept 14 miles of oiled streets smooth and is still at it."

"We used a Killefer Road Planer on old oil surfaced roads that were badly corduroyed and filled with pot-holes. We cut to a depth of 2 or 3 inches and where conditions were extremely bad the oil was cut twice. Cuttings were moved to the shoulders of the road. Six weeks later, we drove over the road and it is as smooth as a newly paved highway. There is no tool that compares with the Killefer Road Planer for reconditioning old roads."

**UNION METAL  
PILE SHELLS  
DON'T REQUIRE  
IMMEDIATE  
FILLING**

● Union Metal Fluted Steel Pile Shells are more than strong enough to withstand surrounding ground pressures. All piles in one foundation section can be driven prior to inspection and filling with concrete, regardless of the time involved. This feature makes possible a more economical pouring operation. It also avoids possible ruptures during the initial setting of the concrete which may be caused by adjacent driving vibrations.

This is but one of the many advantages of Union Metal Pile Shells that enable you to install quality cast-in-place concrete piles for less money. Write today for catalog containing the complete story.

**THE UNION METAL  
MANUFACTURING CO.  
CANTON, OHIO**

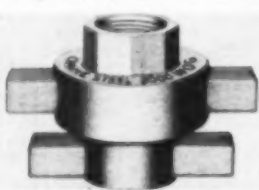
**EVERY  
HAMMER  
BLOW  
COUNTS**

# CONSTRUCTION EQUIPMENT NEWS

(ALL RIGHTS RESERVED)

## *Review of Construction Machinery and Materials for MAY, 1938*

**HAMMER-LUG FORGED STEEL SCREWED UNIONS** for use in piping systems requiring frequent or quick dismantling, either to save time on job or for emergency purposes. In these cases, blow with



hammer upon lug will break joint without using wrench. Available in two kinds—with one and two sets of lugs. Especially recommended for service on hydraulic roll balancing systems in steel mills

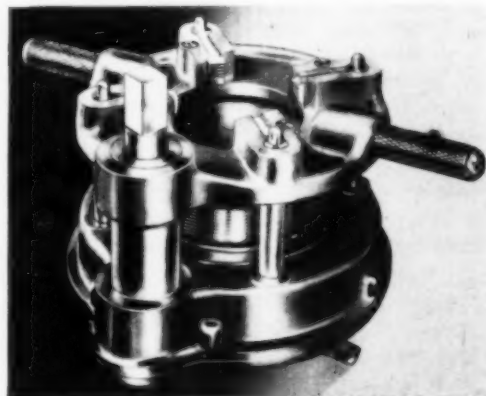
and in oil industry where complete unit has to be dismantled hurriedly and moved to new location. Single lug union made with forged steel tailpieces and thread pieces in sizes, 2-, 2½-, 3- and 4-in. (cast steel on 4-in. size), and have lugs on union ring. Double lug union has lugs on both union ring and thread-piece and is made in ¾-, 1½- and 3¼-in. sizes.—Crane Co., 836 S. Michigan Ave., Chicago, Ill.

**ALUMINUM FOIL INSULATION**, called "Air-Met" and particularly adapted for houses, is said to have high thermal efficiency and these additional advantages: light weight, quick portability, ease of application, imperviousness to moisture and vermin,



long life and elimination of dirt and inconvenience. Consists of two thin parallel sheets of aluminum foil spaced about 1 in. apart by series of triangular air cells of uniform size. Between sheets is light, flame-proof member which holds foil sheets parallel and insures perfect uniformity in size and spacing of intervening air cells. Manufactured in two widths, 15 and 23 in., representing standard distance between studs, joists and rafters, and in sheets 80 ft. long. Only tools required for placing are shears, hammer and broad headed tacks or staples.—The Ruberoid Co., 500 Fifth Ave., New York City.

**SEMI-ADJUSTABLE TAPER-POST TYPE PIPE THREADER**, which uses separate set of dies for each size and threads 2½-, 3-, 3½- and 4-in. pipe, has five mechanical improvements: (1) Extra wide die with wide throat to center and hold tool on pipe, eliminating nuisance of having tool drop out of threading position; (2) gears fully inclosed so that chips and dirt cannot get in them; (3) driving pinion



"straddle-mounted" with both above and below gear teeth on pinion—said to reduce repair bills; (4) dies held in position by spring-backed ball, fully inclosed so that dirt cannot get back of it; (5) proper position for setting dies to cut a "standard" thread is marked by shoulder on tapered post, making accurate setting possible even under poor lighting conditions. Semi-adjustable for cutting oversize or undersize threads. Cuts right-hand tapered threads only.—Beaver Pipe Tools, Inc., Warren, Ohio.

**LIGHTWEIGHT DRIFTER DRILL** in 125-lb. class (DA-30) for use in small drifts, tunnels and stopes, is said to be establishing new low records in cost per foot of hole drilled because of its high speed



and low air consumption. Reason for increased efficiency is new, double-opening, direct flow, small-diameter, lightweight valve, use of which reduces friction losses and insures more power from air used. Parts easily accessible for inspection and repairs.—Ingersoll-Rand, 11 Broadway, New York City.

**NEW TYPE STEEL VALVE** has been developed expressly for high pressure and high temperature service (1,500 lb. at 950 deg. F.) Makers claim that Duravalves with internal Stellite seats put an end to valve maintenance, preventing steam from leaking between valve seat ring and valve body. New valve design permits seat facing to be easily welded in and serviced even on small-size valves. Made in one basic size and then tapped or bored for welding for ½-, ¾- or 1-in. pipe. Builders claim this simplification will take care of 90 per cent of small valve requirements and will greatly reduce repair and maintenance part stocks.—Hancock Valve Division, Manning, Maxwell & Moore, Inc., Bridgeport, Conn.







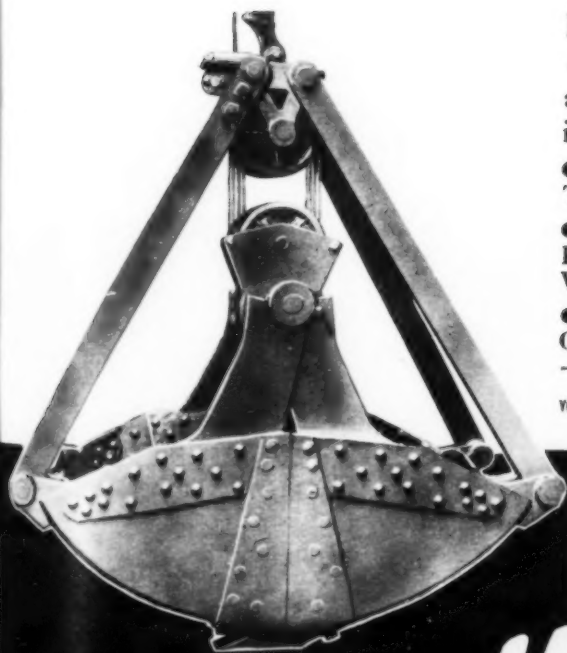
## Haiss-o-saur

THE CLAMSHELL-MOUTHED EARTH DEVOURER  
BORN WITH THE BIGGEST APPETITE FOR EXCAVATING YARDAGE YOU'VE EVER SEEN

No mythological monster this, but an eye-arresting introduction to Haiss Hi-Power — the Clamshell Bucket that has contractors' eyes popping in amazement. It outdigs and outloads anything they've put alongside it. And don't believe it hasn't been tested in tough competition. On jobs like:

- Shaft excavation for New York City's LINCOLN TUNNEL . . . a Mason & Hanger contract.
- Underwater excavation for the piers for the FALL RIVER (R. I.) BRIDGE . . . for Elliott & Watrous.
- The 14' x 35' cross-section FLUSHING MEADOWS SEWER adjoining the World's Fair Grounds — the biggest yet.

YOU CAN'T AFFORD TO BUY ANY NEW BUCKETS UNTIL YOU'VE LOOKED INTO THE HAISS HI-POWER.



**HAISS**  
*Hi-power*  
**CLAMSHELL BUCKETS**

**Free!**

**THE HAISS TOTALIZER YARDAGE**

CHECK MARK EACH 200 YDS

	200	400	600	800	1000	1200
TRUCK AND DRIVER						
1. <i>Pete</i>						
2. <i>Angela</i>						
3. <i>Steve</i>						
4. <i>Alan</i>						
5. <i>Sam</i>						

**TRUCK TALLY**

**COUNTS YARDAGE FOR YOU!**

George Haiss Manufacturing Co., Inc.  
139th St. & Canal Place, New York, N. Y.

☐ Send me FREE one of your handy EXCAVATION YARDAGE TOTALIZERS—for tallying the cumulative amount loaded into a fleet of assorted-size trucks.

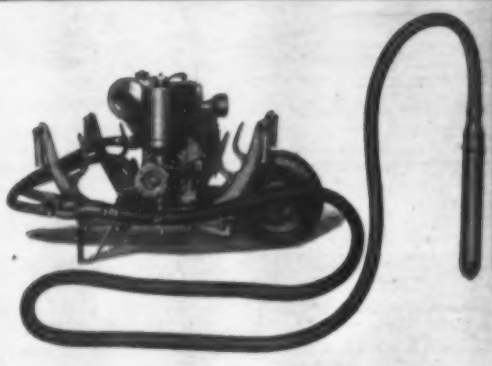
☐ Also send your Hi-Power Bucket circular.

NAME OF COMPANY .....

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# JACKSON HYDRAULIC CONCRETE VIBRATORS GRINDER DRILL



*In One Quickly  
Interchangeable  
Combination*

## VARIABLE SPEEDS—DEPENDABLE—DURABLE



$2\frac{3}{4}$ " Standard vibrator head:  $2\frac{3}{4}$ " x 20". Recommended for all general concrete placing—adjustable frequencies.



$1\frac{3}{4}$ " Special  $1\frac{3}{4}$ " x 36". Vibrator head for thin or heavily reinforced sections—adjustable frequencies.

### GRINDER



The grinder is easy to use—very efficient for surface rubbing of concrete. Five minutes required to change from the grinding wheel to boring attachment, using Jacobs 3-jaw chuck. Drills up to  $\frac{1}{2}$ " diam. in metal or  $1\frac{1}{4}$ " in wood.



### DRILL

In Jackson Hydraulic Vibrators you get the correct relationship of frequency and amplitude to size and weight for uniform consolidation of concrete designed for placement by vibration. Lubrication is no problem—all moving parts operate in the hydraulic medium—a high quality, light bodied oil. *Write today for more information.*

**ELECTRIC TAMPER & EQUIPMENT CO., LUDINGTON, MICHIGAN**

## YOU HAVE NEVER SEEN SPEED

until you have seen a MALL Electric Hand Saw rip through wood. It will cross cut a 3" x 12" board in four seconds and rip through a 2" plank 12' long in 55 seconds—easily, cleanly, and accurately. This is just about ten times faster than any man can do it with an ordinary handsaw.



The new Model 1A MALL Portable Electric Handsaw.

MALL Electric Handsaws are saving hundreds of dollars for carpenters and builders on large and small contracts. It will pay you to investigate and learn what these saws can do for you.

Mail the coupon for additional information!

MALL TOOL CO.  
7757 S. Chicago Av.  
Chicago, Illinois

Other MALL products are concrete vibrators, and surfacers, flexible shaft machines, door mortisers and planes.

Without obligation, please send additional information on the Model 1A and other MALL Electric Handsaws.

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"Established 1885"

## GRUENDLER Road Building — Equipment —

"One Reduction"  
Roller Bearing  
Jaw Crushers

Saves 10% to 15%  
in Fuel  
90% in Lubrication

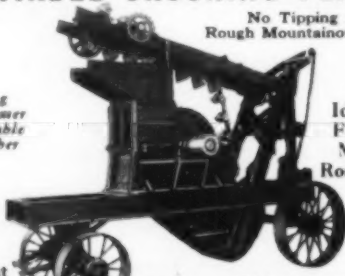
More Production at Lower Cost

Mfrs. of Stationary or Portable Limestone Pulverizers, Gravel and Rock Crushing and Screening Plants, Conveying and Screening Equipment.

### PORTABLE CRUSHING PLANTS

No Tipping on  
Rough Mountainous Roads

Saving  
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Ideal for  
Farm to  
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Adjustable  
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from  $2\frac{1}{2}$ " down to Ag-  
ricultural Dust.

Write for Illustrated  
Bulletins of our Life-  
time Hammer Mill and  
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## GRUENDLER

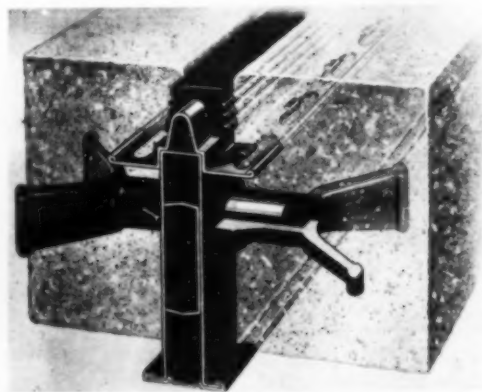
GRUENDLER CRUSHER & PULVERIZER COMPANY  
Plant and Office: 2917 N. Market Street, St. Louis, Mo.

**MEDIUM-DUTY TRUCK**, in  $\frac{3}{4}$ - and 1-ton models, has following unusual features according to makers: powerful truck-type engine; truck-type transmission; high compression cylinder head and vacuum spark advance. Available as extra equipment, airplane



type shock absorbers. Trucks have solid disk wheels and wheelbase lengths of 120 to 136 in. Cab-to-rear-axle dimensions of 41  $\frac{11}{16}$  and 57  $\frac{11}{16}$  in. permit use of 7-ft. express body on 120-in. wheelbase chassis and 9-ft. body on 136-in. wheelbase chassis. Other features: Engine has 218.06-cu.in. displacement with  $3\frac{3}{8}$ -in. bore and 4  $\frac{1}{16}$ -in. stroke, and develops 75 hp. Truck equipped with hydraulic brake drums 11 in. in diameter on front and 13 in. on rear wheels. Three-speed, heavy-duty transmission. — Dodge Division of Chrysler Corp., Detroit.

**LOAD TRANSMISSION DEVICE** called J-Bar, for use in connection with expansion and contraction joints in concrete highway construction, provides means of transmitting vehicle loads from one slab to another. Each unit consists of pair of malleable iron sleeves with integrally cast radiating arms at one



end. Castings, 1 lb. in weight, are reamed to permit short cold rolled steel shaft  $\frac{3}{4}$  in. in diameter to be fitted inside cylindrical bearings of castings. Flanges of sleeves fit snugly against sides of joint so that shafts extending through joint are located perpendicular to joint material. In Illinois, where J-bars are specified, twelve of these units are used in each 20-ft. transverse road joint. Increased capacity of unit and simplicity of installation are said to provide worthwhile economies of road tax funds.—American Concrete Expansion Joint Co., 221 N. La Salle St., Chicago, Ill.

**DUAL CONTROL A.C. WELDER** with separate voltage and amperage controls enables operator to select most desirable voltage for amperage used on any job and is said to supply practically unlimited current settings. Easy to operate by means of dial on front of cabinet and compactly constructed. Built in three sizes with current range from 10 amp. to maximum output making possible welding of sheet or heavy metal. Welder equipped with wheel and handle for easy portability. All three sizes have same cabinet dimensions and vary in size from 235 to 350 lb., furnished standard for 220 v.—Miller Electric Mfg. Co., Appleton, Wis.





# SWING MUSIC FOR MR. ROCHO!

TELEPHONE 601

CABLE ADDRESS "DREDGE"

**BAY CITY SHOVELS, INC.**

CONVERTIBLE  
POWER SHOVELS  
DRAGLINES - CRANES  
EXCAVATING MACHINERY

BAY CITY, MICHIGAN  
April 18, 1938



Engineering News-Record  
330 W. 42nd Street  
New York, New York

Gentlemen:

We hesitate to refer to performance claimed by BAY CITY owners, particularly as during the past six months BAY CITY owners have told us of performance in terms of yardage which we frankly find it difficult to believe.

Attached is a photo of a BAY CITY Model 20 crane with 3/8-yard clamshell and 35' boom owned by Butler Motor Service, Franklin Grove, Illinois. This machine is shown operating at the gravel plant of Rocho Construction Company at Amboy, Illinois. Rocho was working on a large penalty road job and rented the machine from Butler Motor Service to feed his gravel washing plant. The competitive 3/8-yard machine in the background was unable to handle the daily tonnage required and was taken off the job.

Mr. Rocho, who does not own the machine but was responsible for the job, insists this 3/8 yard BAY CITY machine loaded 110 yards of gravel per hour into his washing plant. This yardage, which amounts to over a thousand yards in ten hours, would be considered excellent performance for a 3/4 or one cubic yard machine.

The speed with which the machine is being operated and the ability of the operator is shown in this action picture where the operator has started to swing back to the gravel pile before the clamshell bucket has completed dumping.

Please prepare an advertisement to feature this performance and run it in an early issue with the enclosed photograph.

Yours very truly,  
BAY CITY SHOVELS, INC.

*Morgan Ramsay*  
MORGAN RAMSAY,  
Vice-President.



BAY CITY Model 20-3/4-yard crane was the neck of the bottle. . . . Its capacity was the entire plant's capacity . . . so says Stanley E. Bates of Tractor & Equipment Co., who adds: "Careful, conservative, cautious Mr. Rocho stated that the little Bay City 20 started 110 cu. yds. of gravel through the plant per hour, day in and day out, for several weeks! If any Bay City salesman ever claimed HALF that production to a prospect he would be put down as a colossal liar."

If you like this swing music see your dealer or write Bay City Shovels, Inc., Bay City, Mich.

**Get Lower  
COMPACTION  
COSTS  
and  
GREATER  
DENSITIES**



**With the  
Delmag Self-Powered  
IMPACT Tamper**

This machine, widely used abroad for eight years, now is revolutionizing compaction costs and results in this country. Self-powered through being in itself an internal combustion machine operating on gasoline, the Delmag Tamper eliminates the high costs of the usual outside power plant. It operates on only a pint of fuel per hour.

#### **FASTER—BETTER COMPACTION**

Actual performance records reveal that the Delmag Tamper compacts MORE material in FEWER trips over the fill and produces GREATER densities. Densities greater than highest test standards for earth fill dams are obtainable with this proven machine.

#### **OVER 6000 IN SERVICE . . .**

in the compaction of earth fill dams and dikes, trench and structure backfills, around abutments, retaining walls, etc. Ideal for working in close quarters and around obstructions. Special foot for concrete tamping. Equally efficient, equipped with hammer base, for driving sheeting and light piling, and for breaking concrete, frozen ground, hardpan, etc.

#### **The Delmag Self-Powered Diesel Pile Driver**

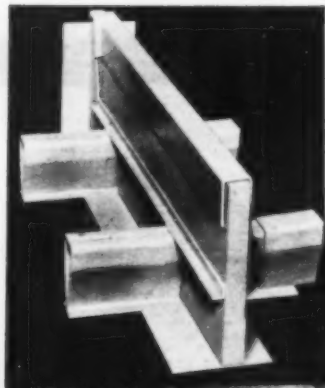
Eliminates outside power supply, operating on Diesel fuel. Seven models from 660 to 5980 lbs. hammer weight bring new speed and unheard-of economy to driving piles of any type or size.



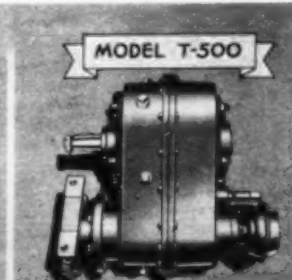
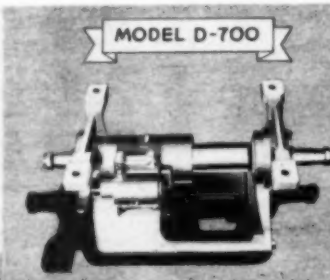
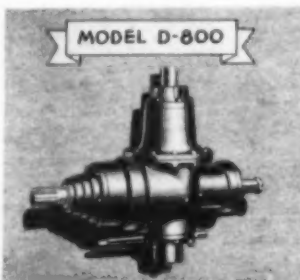
**WRITE FOR DESCRIPTIVE LITERATURE**

**THE  
CALHOUN COMPANY Inc**  
NATIONAL DISTRIBUTORS  
1151 SOUTH BROADWAY  
LOS ANGELES, CALIFORNIA

## **CONSTRUCTION EQUIPMENT NEWS... Continued**



**PRE-FABRICATED DOWELING UNIT**, for forming and doweling transverse joints in concrete pavements, makes use of 10-in.-long tubular dowels of triangular cross-section accurately spaced and shop welded to 4-in.-wide steel base and to an angle bar at top to stabilize unit and to assure fixed position. Use of unit saves time assembling and adjusting joints before concreting. Shipped to job complete where after adjustment of joint filler and cap one or two men may set unit in position fastening it firmly with special removable pins. Steel base turns up 10 in. at outer edge making positive continuous seal around joint, effectively excluding foreign matter. — **Bethlehem Steel Co.** Bethlehem, Pa.



**SPLIT SHAFT POWER TAKE-OFFS**, when installed in any truck, are said to transmit full horsepower and torque of truck motor to any equipment which can be installed on truck chassis. Three models available, each in two different sizes. Model D-700 is direct drive unit without gears. Model T-500 is countershaft drive chain unit and Model D-800 is side-drive gear-driven unit, with power transmitted to side of truck frame. Popular for operating air compressors, water pumps, piledrivers, concrete mixers, rock crushers and like units directly from truck motors. — **Hercules Steel Products Co.**, Galion, Ohio



**MOTOR GRADER** changed from maintainer to construction class by shortening turning radius, increasing maneuverability and traction without increasing weight or power, thus extending capacity for earth handling. Features: (1) Instead of usual two rear power-driven wheels, new model applies power to all four equal-diameter wheels which also are used in steering, thus controlling traction, permitting use of 13-ft. moldboard and increasing blade output; (2) every adjustment controlled by hydraulics, including front and rear steering, extending or retracting of working blade without disturbing position of circle or "floor plane" of road, and raising blade and scarifier. Either single or dual tires may be used. Gasoline or diesel-powered. Scarifier folds up out of way to avoid windrow or load carried by blade. Machine may be fitted with special attachments such as scarifier, bulldozer, backsloper, snow plow and wings. — **The Austin-Western Road Machinery Co.** Aurora, Ill.



**ECONOMIZE**  
**AS YOU MODERNIZE YOUR TRUCK EQUIPMENT**



**SAVINGS**  
*begin with*  
**CHEVROLET'S**  
**LOW**  
**FIRST COST**

### **CHEVROLET TRUCKS**

**give the power and performance  
 you need . . . and with low operating  
 and maintenance costs**

**M**ANY savings in your haulage or delivery costs may be made by modernizing now with 1938 Chevrolet trucks. Save by taking advantage of Chevrolet's low truck prices. Save on gas and oil, on daily maintenance expense—and on month-after-month upkeep costs. Chevrolet trucks lead in economy—in durability and dependability. But first, get the facts that will convince you that, regardless of the job to be done, ruggedly-built new 1938 Chevrolet trucks are the trucks for your job. Call your Chevrolet dealer today.

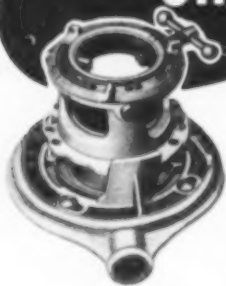
General Motors Instalment Plan—Convenient, Economical Monthly Payments. A General Motors Value.

**CHEVROLET MOTOR DIVISION**  
 General Motors Sales Corporation  
 DETROIT, MICHIGAN

### **CHEVROLET "THE THRIFT-CARRIERS FOR THE NATION"**

Six Chassis Models—Light Delivery,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{2}$  Tons (131 $\frac{1}{2}$ - and 157-inch wheelbases) • Five Wheelbase Lengths—112-inch to 157-inch • Famous Valve-in-Head Truck Engine • Perfected Hydraulic Truck Brakes • Full-Floating Rear Axle • Extra-Strength Frame • Four-Speed Transmission • Modern Styling • On  $1\frac{1}{2}$ -Ton Models.

# STOP the bother of changing Chaser Dies



**RIDGID**  
No. 65R Threads  
1" to 2" Pipe with  
ONE Set of Chasers

Instead of 16 chaser dies to lug around, to risk losing, to waste valuable time changing, this threader has only 4—and they stay in the threader.

A quick shift of the setting post and you're ready to cut perfect threads on 1" to 2" pipe, any metal—a convenience that runs into real money saving.

Like many thousands of users, you go for the new style work-holder that clicks to pipe size with a twist of the gauge ring and tightens with one screw. No bushings to bother with.

Plenty of other efficiency features in this rugged modern threader, you get real satisfaction out of owning and using. Try **RIDGID 65R** at your jobber's—buy it for better, faster, easier threading.

**THE RIDGE TOOL CO., ELYRIA, OHIO**  
Makers of the Famous **RIDGID** Wrench

**RIDGID PIPE TOOLS**

YOU CAN **EXPECT MORE** FROM A  
**STANLEY ELECTRIC TOOL**

**EASIEST  
TO USE-**

**NEW**  
"Duplex" Handle  
Provides  
Unusual  
Balance!

The scientifically designed "duplex" handle gives this new Stanley W-7 Safety Saw that comfortable "feel or hang" when using one or both hands to saw flooring or work on a sawhorse, scaffold or bench.

Powered and cooled for continuous operation, this W-7 Safety Saw cuts through 2 1/4" lumber with amazing speed. The tilting base permits accurate bevel cuts up to 45° through 1 7/8" material. A single wing-nut adjustment controls depth of cut. Patented safety guard gives positive protection at all times. Other Stanley Portable Safety Saws are available up to 6" cutting capacity.

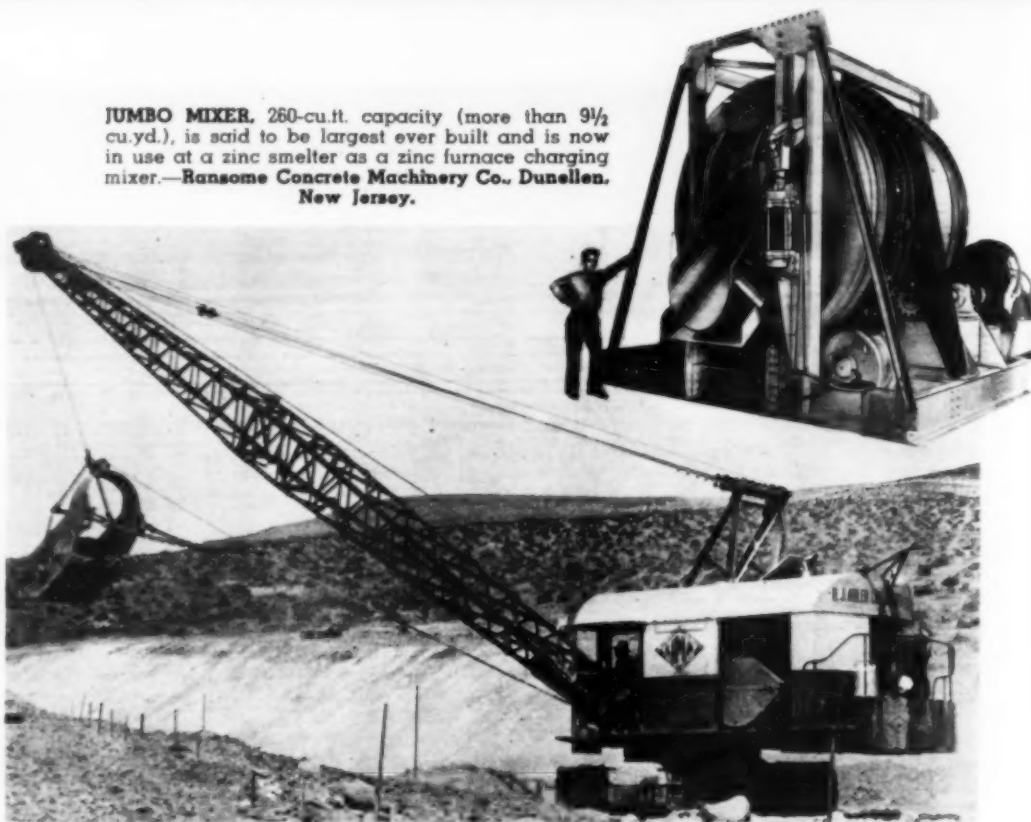
ASK THE STANLEY DISTRIBUTOR FOR A DEMONSTRATION;  
WRITE TODAY FOR DESCRIPTIVE LITERATURE.

Stanley Electric Tool Division, The Stanley Works,  
140 Elm Street, New Britain, Conn.

**STANLEY ELECTRIC SAWS**

"COST LESS  
PER YEAR"

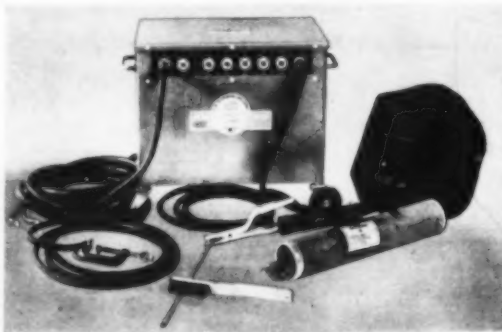
**JUMBO MIXER**, 260-cu.ft. capacity (more than 9 1/2 cu.yd.), is said to be largest ever built and is now in use at a zinc smelter as a zinc furnace charging mixer.—**Ransome Concrete Machinery Co., Dunellen, New Jersey.**



**HEAVY-DUTY SHOVEL**, dragline, crane combination built to standards which effect higher production, greater fuel economy and lower upkeep. Outstanding features: (1) Anti-friction bearings at every important bearing point; (2) helical gears; (3) extra large diameter drums; (4) hoist and swing clutches, vacuum power set; (5) boom may be raised or lowered during hoisting, swinging and travel operations; (6) all-welded box-type boom with large diameter boom point sheave; (7) outside box-type dipper handle; (8) one-piece manganese steel 2 1/2-cu. yd. dipper with 26-ft. boom and 18-ft. dipper handle; (9) diesel, oil or electric power; (10) properly balanced to reduce weight. **Lima Locomotive Works, Inc., Lima, Ohio.**

**LOW COST PORTABLE A.C. WELDER** (Midget Marvel) for use in maintenance and repair as well as light construction comprises special transformer and control especially designed for a.c. arc-welding. Current range of sets is from 30 to 140 amp. with twelve steps of current adjustment. Secondary open voltage is 50 on low range and 55 on high. Primary current input for welding at 140 amp. is 70 amp. at 110 v. and 35 amp. at 220 v. and is proportionally

lower when welding at lower range. Set designed for use with coated electrodes from 1/16 to 5/32 in. in diameter. Equipped with handles and four large hard rubber swivel casters for moving readily to convenient locations. Weights: 60-cycle set, 112 lb.; 50-cycle set, 130 lb. Dimensions: 14 1/4 in. high, 10 3/4 in. wide, 17 7/8 in. long, including handles. Accessories included with each set: welding lead with holder and current adjusting plug attached, ground lead with "C" clamp, helmet, wire brush, liberal supply of Crucible Weld electrodes and primary lead.—**Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.**



**HOLE BORER AND POLE SETTER**, for mounting on standard crawler tractors or heavy-duty trucks, is said to cut to minimum cost of boring holes and setting power line poles. Hydraulically operated with boom which may be raised or lowered to spot auger in desired location. Bore holes any diameter to 16 in. and to depth of 7 ft. In ordinary earth it will bore 6-ft. holes 15 in. in diameter and set ten 40-ft. poles per hour with average spacing of 380 ft. Has reach of 20 ft. on tractor mounting making it possible to bore holes and spot poles over ditches and high fences, on embankments and in out-of-the-way locations without leaving highway. Auger and leads hang plumb regardless of position of tractor or truck, facilitating spotting for vertical boring. Angle boring done by swinging leads to angle required at side, front or rear. Auger driven by six-cylinder radial hydraulic motor through wide face ball-bearing reduction gears running in oil and fully enclosed. Automatic safety valve adjustable for maximum pressure up to 1,000 lb. prevents damage to auger or bit when obstruction is encountered. Machine operated by two men, machine operator and ground man. Different diameter augers may be quickly installed.—**Hughes-Keenan Co., Mansfield, Ohio.**



# BUCYRUS-ERIE

## *Greater* **FLEXIBILITY** *in Scraper work*

The versatility of the Bucyrus-Erie 4-Wheel Scraper — its easy maneuverability and accurate response to control — readily adapts this equipment for short-haul cut-and-fill operations, building shoulders, ditching, side borrow-pit excavation, stripping overburden from mines or quarries, levee and dyke construction, and a wide range of roadbuilding performance. The Bucyrus-Erie 4-Wheel Scraper is offered as a newer, more modern method in an already proven practice of moving dirt. Knowledge of its performance is gained from actual cost records of responsible owners. It will pay you to get full particulars about the Bucyrus-Erie Scraper method.



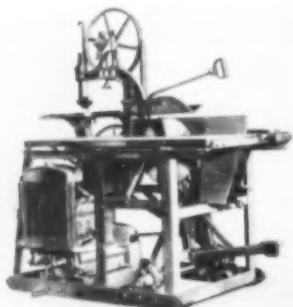
**BUCYRUS  
ERIE**

**BUCYRUS-ERIE CO., SOUTH MILWAUKEE, WIS., U. S. A.**

*Excavating, Drilling, and Material Handling Equipment*

# CH&E.

Saw Rigs — Pumps — Hoists  
Elevators — Mortar Mixers — Rollers  
Bar Benders and Bar Cutters.



No. 28 Saw Rig

## C. H. & E. is on every job

A complete line of improved design self-Priming Centrifugal Pumps, Diaphragm and Triplex Road Pumps. Light and heavy duty Hoists, 2 and 3 Ton Rollers for rolling Play grounds, driveways, patch work.

Send for our catalog.

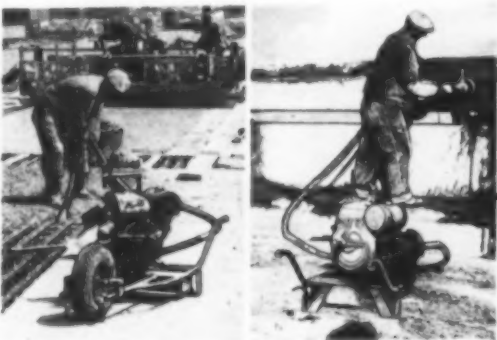
C. H. & E. MANUFACTURING CO., Inc.  
3840 N. Palmer St., Milwaukee, Wis.

## A "JACK OF ALL TRADES" OLD STUFF, YOU SAY? LISTEN TO THIS!

ONE MALL power unit will VIBRATE concrete and SURFACE the concrete after the forms are stripped. You can use it, too, for DRILLING, PUMPING, GRINDING, or SAWING. How? By simply attaching the required tool for each application.

These versatile tools will earn big dividends on your next job.

We'll gladly send bulletins.



MALL vibrator with gas engine power unit. The same power unit used for concrete surfacing.

### MALL TOOL COMPANY

7757 South Chicago Avenue, Chicago, Illinois

Without obligation, please send additional information on MALL Concrete Vibrating and Surfacing Machines.

Name.....  
Address.....  
City..... State.....

## NEWS FROM MANUFACTURERS

### About Their Products

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use

CONTRACTORS' EQUIPMENT—Chicago Pneumatic Tool Co., 6 E. 44th St., New York City, (12 pp. illustrated). Pictorial listing of line of contractors' equipment such as portable compressors, gasoline and diesel driven; utility compressors, 85 c.f.m. capacity, specially designed for mounting cross-wise on motor trucks leaving room for hauling men and materials; semi-portable diesel driven and stationary horizontal single stage and duplex, single and two-stage air compressors; sinker drills; demolition tools; hand-feed drifters; completely automatic auto-drifters; light Mitchell diamond drills; wagon drills; clay diggers and backfill tampers; sump pumps; concrete vibrators; concrete surfacers; rotary drills; Boyer air-cooled riveting hammers; Boyer rivet busters; scaling and chipping hammers; rotary drills; rotary wood borers; Universal electric grinders; drill stands; numerous accessories for use with this equipment. Catalogs fully describing any specific unit available upon request.



COLORED GLASS BRICK—Marks Bros., Inc., 470-80 E. 133rd St., New York City, (4 pp. illustrated). Flexibility of design, blended and varied color effects and interesting surface patterns are advantages claimed for these units which are recommended for use on storefronts, facia, doorways, windows, patios, sunrooms, partitions, fireplaces, alcoves, bars, walls, panels for indirect lighting and for other architectural and decorative purposes. Manufactured in seven colors: crystal, rose, amber, blue, dark brown, light and dark green. Seventeen patterns include "Radium", "Dalle Vertica", "Radium Centre", "Radial", "Glava", (illustrated in folder) and fluted, prismatic, hammered and smooth surface available in attractive treatments. Brick are of solid construction and range in size from 6x6 in. to 9 1/4 x 9 3/4 in. and in thicknesses from 1 1/8 to 2 in.

POWER SHOVELS DRAGLINES, CRANES AND EXCAVATORS—Bay City Shovels, Inc., Bay City, Mich. New literature describing and illustrating these units is available in following catalogs and bulletins: (1) Bulletin 50 containing condensed information and illustrating standard design of all Bay City models from 3/8 to 1 1/4-yd. capacity, both crawler and motortruck mounted; (2) Catalog 10-B (10 pp. illustrated). Detailed specifications and working range diagrams of Models 10, 12 and 15 shovels, cranes and draglines for motor truck mounting in capacities from 3/8 to 3/4 cu. yd. Crane capacities from 5 to 7 1/2 tons. (3) Catalog 25-A (8 pp. illustrated). Working range diagrams of new model 25 light 1/2-yd. convertible shovel, dragline crane or trench hoe with working weight of 25,000 lb. (4) Catalog 65-B. Detailed specifications, working range diagrams and illustrations of 1 1/4-yd. convertible shovel, dragline, crane or trench hoe with working weight of 70,000 lb.



HYDRAULIC CONTROL EQUIPMENT—Vickers, Inc., 1400 Oakman Boulevard, Detroit, Mich. Designed to replace manual operation of road-building and maintenance equipment excavating machinery truck hoists, etc. Series of bulletins covers hydraulically balanced vane-type pumps producing working pressures up to 1,000 lb. per square inch and heavy-duty, multiple-unit valve assemblies providing fast, easy and positive "finger touch" control for a variety of motions on machines fitted with this type of equipment. Eliminates gears, clutches and linkages for control of mechanical movement of machine parts. When valve controls are in neutral position oil pump discharge flows freely to tank.

## The New TRANSIT

PIONEER OF TRUCK MIXERS



Sets a new standard in concrete quality —and economy!

Mixing blades designed strictly for MIXING. Water injected with great rapidity under pressure.

Proportioned for ideal weight distribution. Low center of gravity. Mixer frame takes up all thrust, torsional or other strains. Discharge controllable from rear, or from driver's seat. In brief—more and better concrete for lowest operating and maintenance cost.

SEND FOR THE TRANSIT CATALOG

TRANSIT MIXERS, Inc.  
75 West St., New York City, N. Y., U. S. A.

ALL-WHEEL DRIVE PASSENGER AND COMMERCIAL CARS—Marmon-Herrington Co., Indianapolis, Ind. (4 pp. illustrated) Company now offers complete line of Ford V-8 passenger and commercial cars with power and traction on all wheels for use of oil scouts and operators, mining engineers, logging contractors, rural mail carriers and others who have hitherto been compelled to depend on animals for transportation. All standard Ford passenger cars commercial and light delivery models may be converted to all-wheel-drive and also larger Ford trucks and truck-tractors. These all-wheel drive Ford models have all flexibility, speed and easy steering of standard models and at the same time will take sharp curves at high speeds with safety, will cling to slippery, icy roads and will plow through deep sand or mud.

HOSE—Manhattan Rubber Mfg. Div., Raybestos-Manhattan, Inc., Passaic, N. J. (4 pp. illustrated). In addition to showing a number of actual and unusual installations of Manhattan and Condon hose in use in a wide range of different industries, this folder also contains a detailed description of construction of Manhattan hose and includes technical data helpful to users of these products.

AIR COMPRESSORS—Schramm, Inc., West Chester, Pa. (12 pp. illustrated). Gives complete presentation of portable and stationary "Fordair" models with their specifications. New and outstanding developments are claimed through use of Ford V-8 block as basic unit for this particular type of compressor construction and design, all of which may be seen in Bulletin 3815-CD which may be had upon application to the Schramm Co.

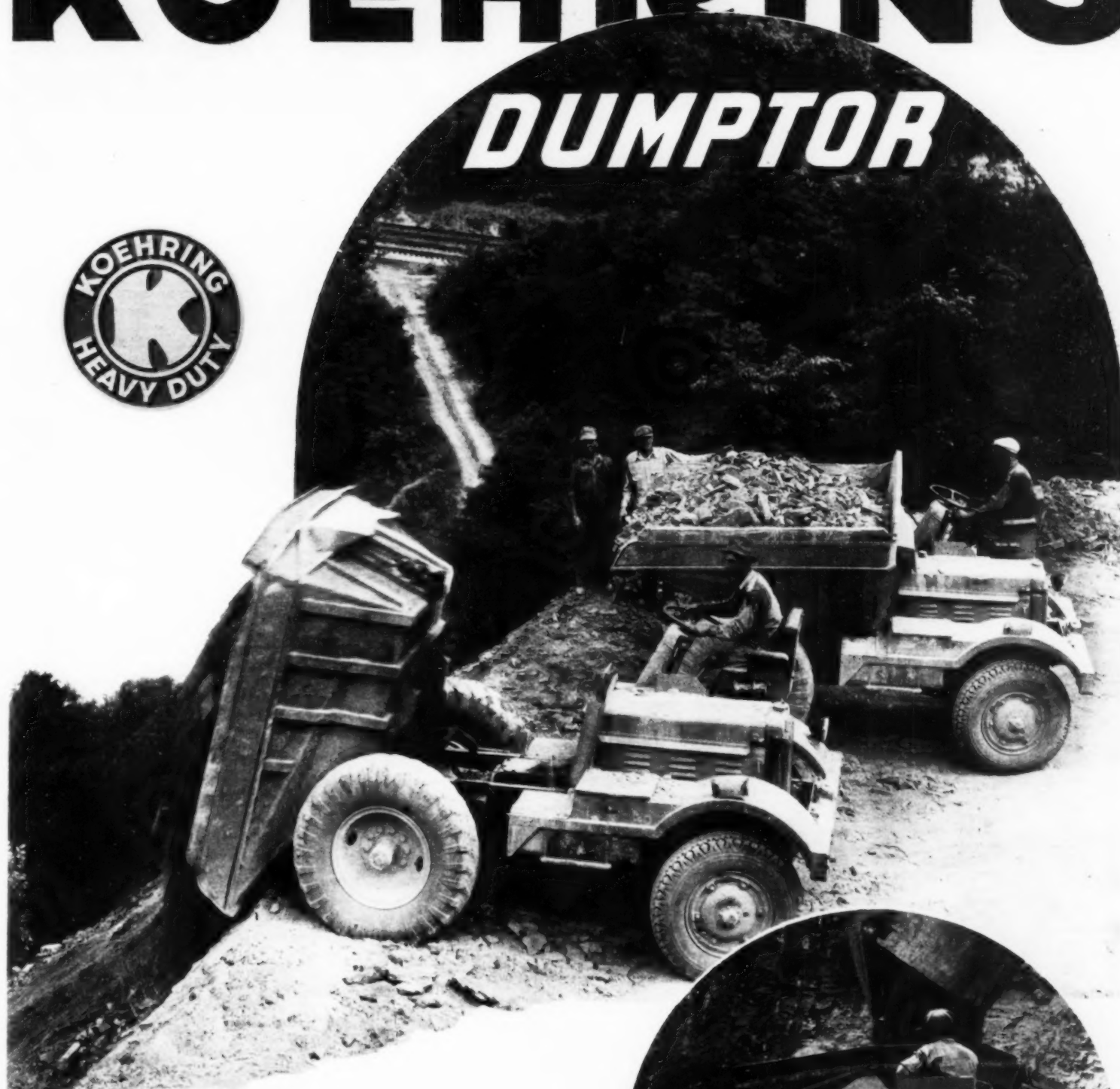


STREET LIGHTING PRACTICE—Westinghouse Electric & Mfg. Co., Lighting Division, Cleveland, Ohio. (20 pp. illustrated.) Entitled "Safety With Light," this booklet describes and illustrates the new technique of street lighting giving correct specifications for lighting town and city streets. Various types of luminaires and standards are pictured.



# KOEHRING

## DUMPTOR



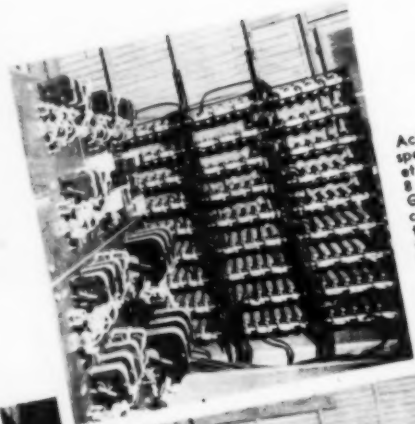
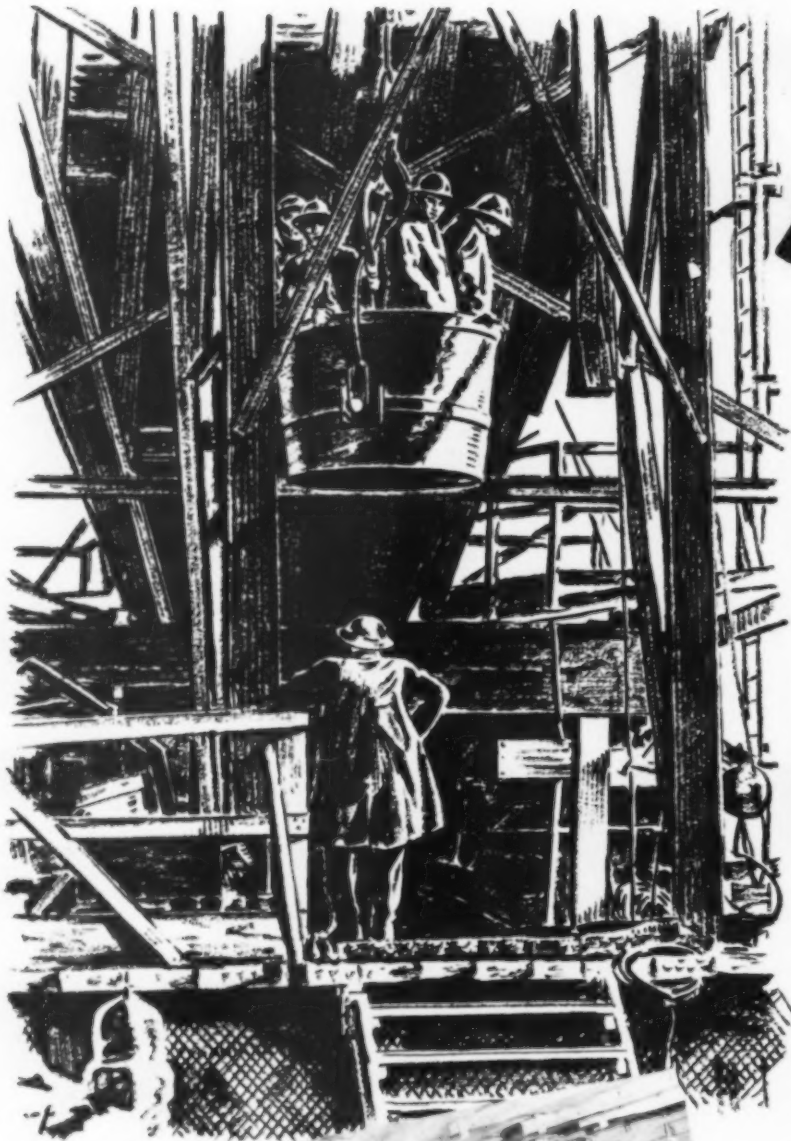
Instantaneous and convenient dumping on any kind of fill, having an open or a cramped approach, is an outstanding, time-saving feature of Koehring Dumptrors. Time saved at the fill, plus savings at the loading point and while traveling materially increase the daily production. Haul and place more rock and dirt by using Koehring Dumptrors.



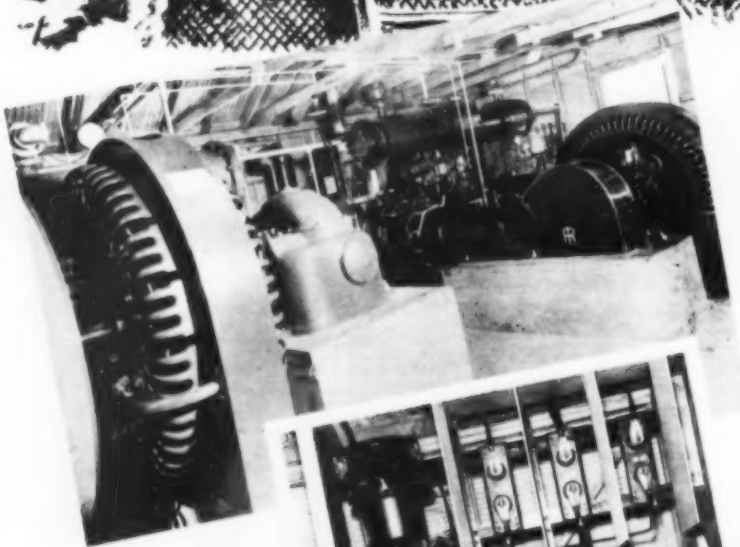
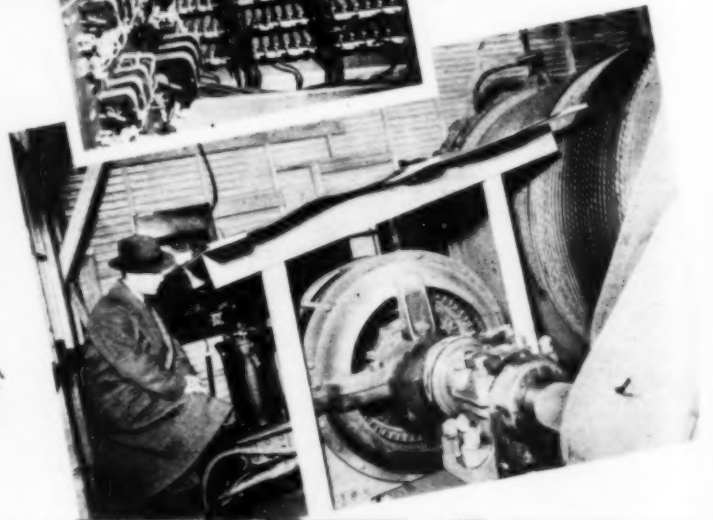
### KOEHRING COMPANY

Pavers • Mixers • Shovels • Cranes • Draglines • Dumptrors • Mud-Jacks  
3026 WEST CONCORDIA AVENUE, MILWAUKEE, WISCONSIN

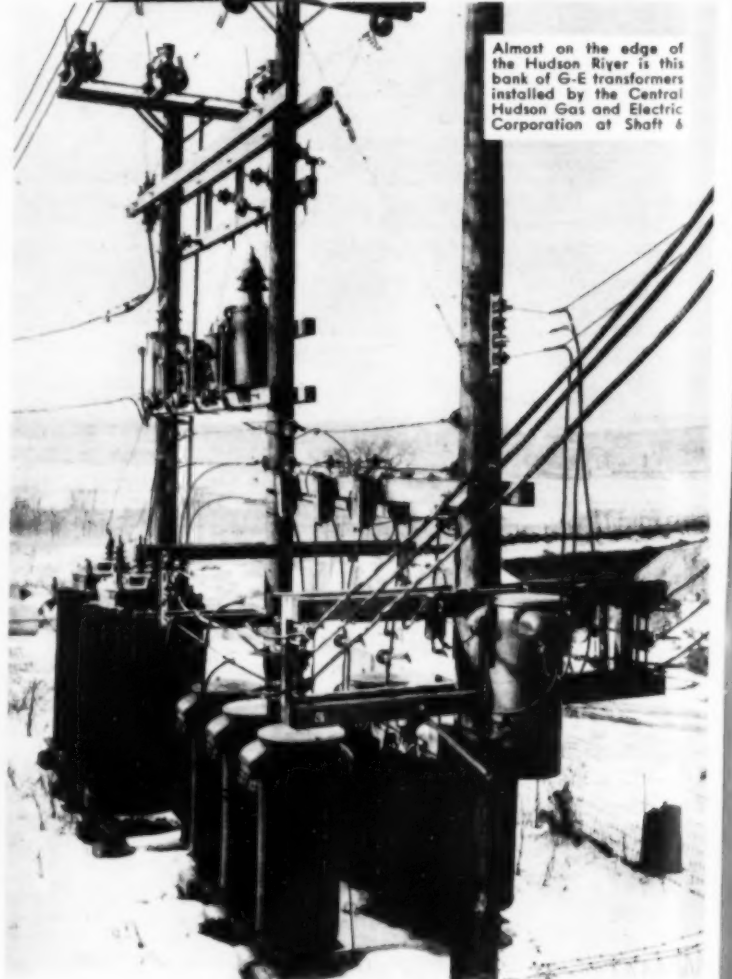
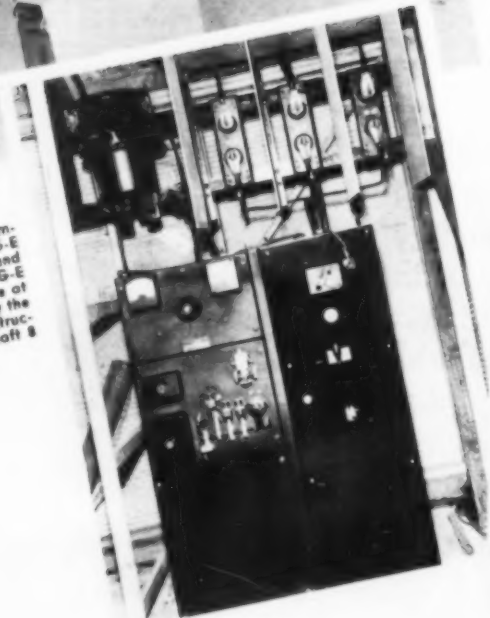
# Building



Accuracy for jogging and speed for lowering the bucket into the 1,015-foot Shaft 8 are both provided by the G-E panel at left, which controls the 200-hp G-E motor and Thruster brake on the Lidgerwood hoist shown below



These Ingersoll-Rand compressors, driven by G-E motors and synchronous motors and controlled by two G-E controllers like the one at the right, are used by the W. E. Callahan Construction Company at Shaft 8



Almost on the edge of the Hudson River is this bank of G-E transformers installed by the Central Hudson Gas and Electric Corporation at Shaft 6



# The World's Longest Tunnel

## G-E EQUIPMENT HELPS START THE 85-MILE DELAWARE AQUEDUCT

**T**O INCREASE its supply of pure mountain water, the City of New York is engaged in one of the largest construction projects ever undertaken. An 85-mile tunnel will be bored in solid rock to bring water to the city from the headwaters of the Delaware.

Thirty shafts, from 310 to 1,550 feet deep, are being sunk to reach the tunnel level, which lies far underground, with a maximum depth of about 2,500 feet under the crest of the Shawangunk range.

The pictures on these two pages show some of the ways in which contractors on this job are using G-E equipment in sinking the shafts for the tunnel. These illustrations represent only a few of the scores of uses electricity has for all types of construction projects.

The correct electric equipment can often give you speed and safety in your operations that can be directly reflected in lowered completion time and lower insurance rates. For all types of electric apparatus and devices get in touch with the nearest General Electric office as shown in the box at the right. No matter where your projects are located, you'll find G-E service close at hand. General Electric, Schenectady, N. Y.

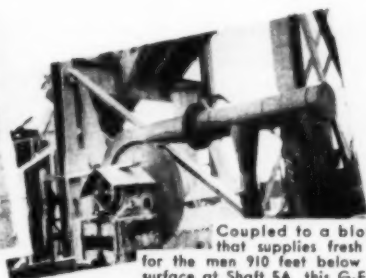
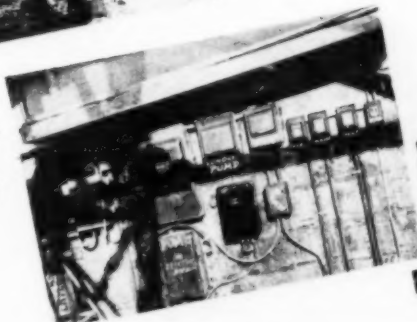


At Shaft 6 the Frazier-Davis Construction Company uses this 25-hp G-E motor to drive a Rex concrete mixer.



Typical of many of the tipples of the shafts of the Delaware Aqueduct is this one of the Dravo Corporation at Shaft 23. Most of the electric equipment for this shaft, from that for the hoist, whirler, and compressors to the battery locomotive used in the tunnel, is General Electric.

Only a narrow ledge protects these G-E switches at the Shaft 18 derrick from the weather. They stand up, no matter how tough the service!



Coupled to a blower that supplies fresh air for the men 910 feet below the surface at Shaft 5A, this G-E 15-hp motor provides dependable operation even under the most adverse weather conditions.

### Sales Engineers Near Your Job

Akron, Ohio	Memphis, Tenn.
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Grand Rapids, Mich.	Springfield, Mass.
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	Youngstown, Ohio

YOU GET GREATER SPEED AND SAFETY, MORE SERVICE FOR YOUR MONEY, WHEN YOU SPECIFY G-E EQUIPMENT

# GENERAL ELECTRIC

Filing No. 162

011-543

This good looking \$250,000 water treatment plant of Architectural Concrete at Fort Knox, Kentucky, was designed by the Quartermaster General's office. Cast stone was skillfully used for grilles and trim. Exterior finished with two coats of portland cement paint. Built under the direction of Lieut. C. M. Scrips, assisted by Thomas E. Leahy, supervising engineer, and C. W. Sieman, superintendent of construction. Contractor, Charles H. Thompson Co., Washington, D. C.



## There are profits for contractors in **ARCHITECTURAL CONCRETE**

If you made a tour around the country, you'd find scores of buildings of all kinds and sizes being built with Architectural Concrete. And the owners of those buildings would give you sound, business reasons for their choice. They'd tell you that concrete provides firesafety, long life and low maintenance *plus* architectural distinction at low first cost.

It will pay you to get in on the contracts that are being let for concrete buildings. The technique for creating wall texture and ornament through the method of forming . . . for building beautiful walls of dense, weather-resistant concrete at low cost is not difficult.

The free manual, "Forms for Architectural Concrete", gives helpful information. Write for your copy.

**PORTLAND CEMENT ASSOCIATION**  
Dept. A5-16, 33 W. Grand Ave., Chicago, Ill.

*A National Organization to Improve  
and Extend the Uses of Concrete*

# Architectural Concrete

Architectural and structural functions combined in one enduring firesafe material.

### A Few Architectural Concrete Jobs

50 San Francisco school buildings  
Many schools in Los Angeles and surrounding towns  
Wrangel Institute, Wrangel, Alaska  
Decker Building, Juneau, Alaska  
Alaska Electric Light & Power Co., Juneau, Alaska  
Federal Building, Point Barrow, Alaska  
Auditorium, Cape Girardeau, Mo.  
Wofferman's Store, Kansas City, Mo.  
Mid-South Cotton Growers Ass'n., Memphis, Tenn.  
Sunkist Building, Los Angeles, Calif.  
Will Rogers Theater, Chicago, Ill.  
Rhodes Theater, Chicago, Ill.  
Cine Theater, Chicago, Ill.  
Montgomery Ward Mail Order and Retail Stores, Albany, Chicago, Baltimore, St. Paul, Denver, Ft. Worth, Los Angeles and others  
Swarthmore College Field House, Swarthmore, Pa.  
Power Plant, North Platte, Nebr.  
Edison Memorial Tower, Menlo Park, N. J.  
Coit Tower, San Francisco, Calif.  
County Jail, Atlanta, Ga.  
Knox County Workhouse, Knoxville, Tenn.  
Horse Pavilion, Minnesota State Fair, Minneapolis, Minn.  
Ed. L. Bailey, Jr. High School, Jackson, Miss.  
Columbia High School, Columbia, Miss.  
Edmond Meaney Hotel, Seattle, Wash.  
St. Joseph Church, Seattle, Wash.  
Horace Mann, Jr. High School, San Antonio, Texas  
Fine Arts Center, Colorado Springs, Colo.  
Spreckels Sugar Refinery, Woodland, Calif.  
Staley Mfg. Co. Laboratory, Decatur, Ill.  
Sears Roebuck & Co. Stores, Baltimore, Detroit, Chicago, Los Angeles  
St. Joseph's Maternity Hospital, Houston, Texas  
NBC Studios, Los Angeles and San Francisco  
Columbia Broadcasting Studios, Los Angeles and San Francisco  
Borden's Creamery, San Antonio, Texas  
General Foods Company Plant, Kankakee, Ill.  
Public Market, Portland, Ore.  
Apple Growers Exchange, Hood River, Ore.  
Beloit Stadium, Beloit, Wis.  
Greyhound Bus Depot, New Orleans, La.  
Caterpillar Tractor Building, Walla Walla, Wash.  
Grace Cathedral, San Francisco, Calif.  
Testing Basin and Laboratory, U. S. Navy, Carderock, Md.  
Bureau of Engraving & Printing Warehouse, Washington, D. C.  
Naval Supply Base, Brooklyn, N. Y.  
Post Offices and Federal Court Buildings in numerous cities  
Many scores of armories and other state buildings of importance from coast to coast.



**WASTED  
TIME—at  
\$20<sup>00</sup>  
AN HOUR!**



## **Tractor breakdowns kept equipment idle . . . when minutes meant dollars**

**T**HE Hobbs-Wall Logging Company, of Crescent City, California, were experiencing the unpleasant sensation of watching profits dribble through their fingers. Their 75-H.P. Diesel tractors were breaking down, causing delays and keeping equipment idle at an estimated cost of \$20.00 per hour!

Shell engineers went to work with Kenneth Cunningham, tractor engineer, and Chas. Martin, woods supt.

The Hobbs-Wall tractors, used for dragging heavy logs over rough ground and working at extremely high temperatures, were breaking down due to heavy sludge formation and sticking rings and valves.

After noting all operating conditions and making a thorough examination of the Diesels, Shell engineers recommended the proper Shell Lubricant.



The Hobbs-Wall Company found immediate satisfaction. They report engines "operating cooler" with no more valve and ring sticking. They further claim a substantial saving in lubricants alone. Most important of all—delays which were formerly so costly have been completely eliminated!

Are you a Diesel operator? Then this case history from the Shell files is important to you. It is but *one* example of the way Shell men are getting *results* with Shell Industrial Lubricants. Shell has a mighty big "plus" to offer you. Hard-headed, practical experience, gained in every industry, coupled with the finest lubricants on the market today. This "plus" is always ready to meet *your* problems. Call or write your nearest Shell office.

# **SHELL CONSTRUCTION LUBRICANTS**



### No Scarifying Job Too Tough for an A-W GIANT RIPPER

The A-W Giant Ripper, engineered to operate in any material which teeth can enter, is shown here tearing out great pieces of frozen soil. Wherever there is extra hard scarifying to be done the A-W Giant Ripper pays big dividends on its cost . . . avoids delays . . . paves the way for substantial yardage increases and time savings by the scraper which follows it. Practically impossible to break, the A-W Giant Ripper takes every job in stride. It is built to rip any material through which the most powerful tractor can pull it.

**THE AUSTIN-WESTERN ROAD MACHINERY**



# BAKER'S DOZEN IN SCRAPER OUTPUT...

## Reserve the Full Power of Your Tractor for Digging

The scraper that pays maximum dividends on its cost is the one that will take a full load every trip . . . that gives "baker's dozen" value in yardage for every pound of tractor power applied to it.

With an Austin-Western 12-Yard Hydraulic Scraper on the job you're sure of these time and money saving advantages. Every operation of gate, pan and discharge is hydraulically controlled by the A-W Scraper's own motor. There is no diversion of tractor power to sap its pulling effi-

ency or reduce its speed . . . no delayed response due to slow-acting controls, no lessening of the drawbar pull. You get faster digging . . . positive gate closing . . . fast and complete dumping. And, because the A-W Scraper is independently powered, there is no time out for removing cables and drums when the tractor is needed for other work.

Mail coupon for full details on distinctive engineering features and proof that they assure increased yardage, time-savings, and low cost on both operation and upkeep.

**The Austin-Western Road Machinery Co.**  
AURORA, ILLINOIS

# AUSTIN- WESTERN

**THE AUSTIN-WESTERN ROAD MACHINERY CO.**  
1814 Burrows Street, Aurora, Illinois

Please send full details on:

☐ 12-Yard Scraper  
☐ Giant Ripper

☐ Motor Grader  
☐ Shovels and Cranes

☐ Elevating Graders  
☐ Blade Graders

☐ Crushing and Screening Plants  
☐ 5-Yard Scraper

Name \_\_\_\_\_

Address \_\_\_\_\_

State \_\_\_\_\_

12-5834

**CO., AURORA, ILL.**

**GEARED TO MESH**

*The*  
**27E**

**TODAY'S JOB**



**S**TEADY, continuous equipment operation is the essential factor in road paving profits. Proved equipment that dovetails into the production scheme without lost time or motion can be depended on for full dollar investment value and maximum production returns.

In these times when contracts involve short mileages, the Multi-Foote 27E fits into the standard paving picture without the need for additional larger auxiliary equipment. It is geared to mesh completely with present material handling arrangements. In cases where certain jobs may warrant increased paving speed and output, two Multi-Foote 27E's combine to produce more footage and still retain unit flexibility.

**THE FOOTE COMPANY, INC.**  
Nunda New York

**For Stone**  
The Adnun Finish Spreader—a low cost machine that handles any material and shapes crown or bank. Ask about it.

**For Black Top**  
The Adnun Black Top Paver lays any mix, any width, any thickness! The only Black Top Paver with 6 years actual service behind it. Catalog on request.

**MULTI FOOTE**  
**CONCRETE PAVERS**



WHAT DO YOU KNOW  
ABOUT BYERS SHOVELS?

I KNOW THE WHOLE  
STORY. JUST BOUGHT  
MY FOURTH BYERS!

**A FEW TYPICAL BYERS  
FLEETS OF CURRENT  
MODELS NOW OPERATING**

- 4— $\frac{3}{8}$  yd. cranes for a Boston Utility.
  - 3— $\frac{1}{2}$  yd. diesel shovels and trailers for S. African Gov't.
  - 11— $\frac{3}{4}$  yd. diesel shovels and Bearcat Jr.  $\frac{3}{8}$  yd. shovels for N. Canada.
  - 2— $\frac{1}{2}$  yd. shovels for Wisconsin contractor.
  - 4— $\frac{3}{8}$  yd. Bearcat Jr. shovels for Mexican Oil Company.
  - 3— $\frac{3}{8}$  yd. heavy duty full circle shovels and cranes for S. California utility.
  - 4— $\frac{3}{8}$  yd. Bearcat Jr. cranes for Kansas contractor.
  - 2— $\frac{1}{2}$  and  $\frac{3}{8}$  yd. diesel shovels for Canadian Gov't.
  - 4— $\frac{3}{8}$  yd. Bearcat Jr. shovels and trailers for Texas County.
  - 4— $\frac{3}{8}$ ,  $\frac{1}{2}$  and  $\frac{3}{4}$  yd. shovels for Oklahoma zinc mine.
- ... and many others too numerous to mention have standardized on Byers shovels and cranes.



"Repeat buyers" of Byers shovels and cranes and "quantity orders" are no novelty to us. We have 'em... lots of 'em. In fact, we're proud as can be of Byers fleet owners.

Many, many contractors and political subdivisions have chosen Byers over and over again. They seem to like our honest values and extra service and fair, generous dealings with them. Therefore, when they want another shovel or crane, they naturally turn again to Byers.

Someday, when the advantages of Byers shovels and Byers service are really impressed on your mind, you, too, will join the procession. You'll go to Byers... and stay with Byers modern improved line, just like countless other owners have.

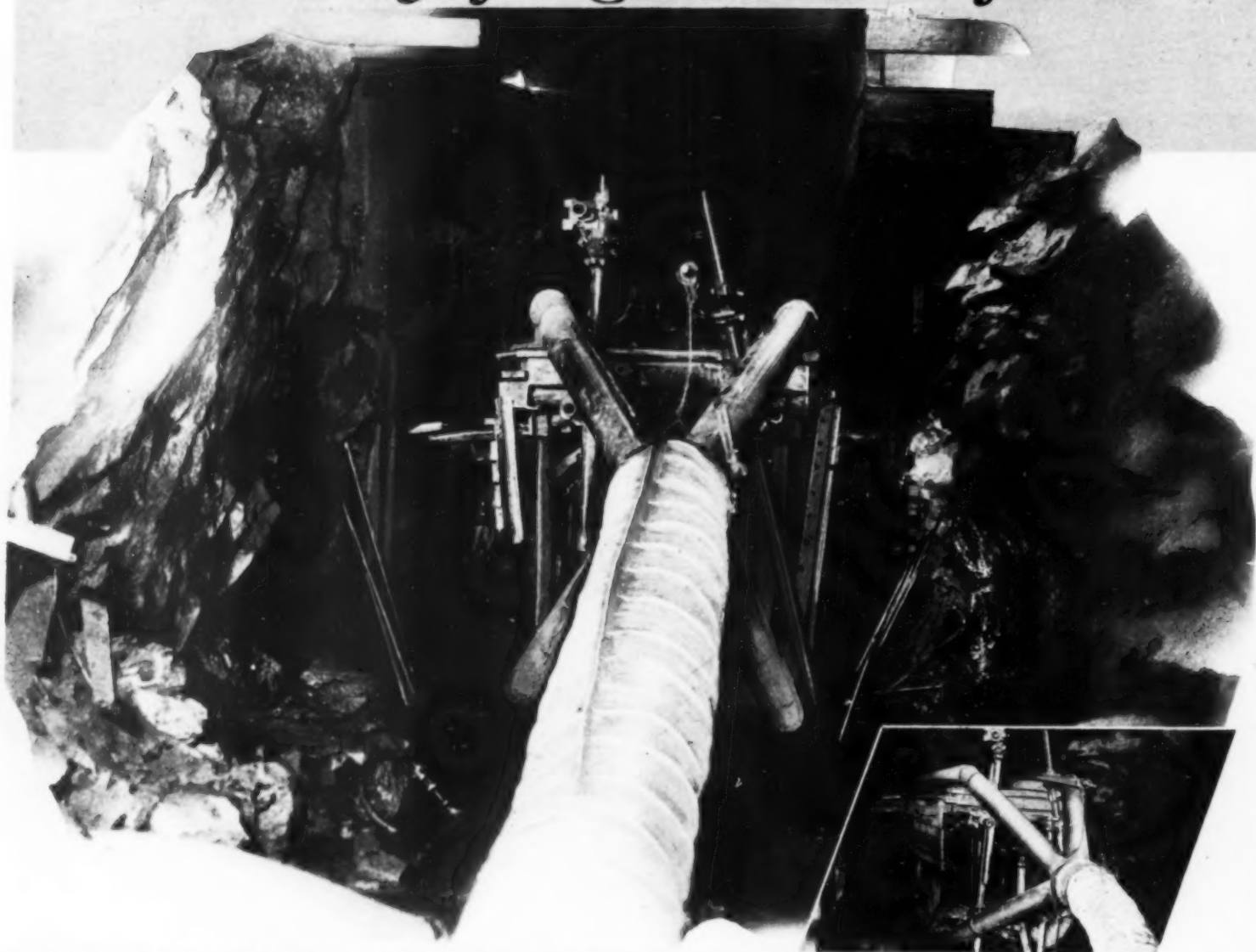
We believe the sooner you get "converted," the sooner you will start forging ahead in your business. Byers is willing and able to help you now, to do a better, faster, lower cost job in 1938. How about it?



**THE BYERS MACHINE CO. • RAVENNA, OHIO**  
LOCAL DISTRIBUTORS THROUGHOUT THE WORLD

**BYERS**  
SHOVELS • CRANES • DRAGLINES • TRENCH HOES

# "VENTUBE" helps 6<sup>th</sup> Avenue subway forge ahead fast!



## SPEEDS UP WORK BY KEEPING ATMOSPHERE CLEAR OF DUST, SMOKE AND POWDER FUMES

THE USE OF flexible "Ventube" rubberized ventilating duct with wet drilling has proved remarkably successful in the driving of New York City's gigantic new subway line. Tests prove that this type of drilling reduces the dust content well below the safe hygienic limits—and exceeds the legal requirements set up by the New York state law.

"Ventube" keeps the head-

ings clear. There is no draft at the face. No time lost in waiting for powder fumes to disappear and dust to settle. Consequently, work is faster and safer!

On BIG jobs everywhere, "Ventube" ventilating duct is helping keep costs down and speed up work. We'd like to show you how "Ventube" can save you time and money. Write today for complete information.



THE FLEXIBLE

VENTILATING DUCT

**E. I. DU PONT DE NEMOURS & COMPANY, INC.**

"FABRIKOID" DIVISION

FAIRFIELD, CONNECTICUT

This jumbo carries six wet drifters and four 10-inch ventilating pipes extending into the drill operating zone. A single line of non-collapsible "Ventube" sucks the dust-laden air away from the face. The flexibility of "Ventube" makes it easy to pull the jumbo away from the face and to drive it up to the heading again.



This durable, economical powder bag is made of the same type of material as is "Ventube" ventilating duct. It is both coated and impregnated with rubber that won't peel off. Like "Ventube," it is highly resistant to acid water, damp or dry rot, fungus, moisture and gases. Write for sizes, prices and complete information.



**KANSAS** "In blue shale which we were unable to cut with other scrapers the Heil Scraper took about a two-inch cut and loaded within a distance of seventy-five feet."

**TEXAS** "We have found it unnecessary to use a rooter as the Heil scraper has enough down pressure to load itself in any soil condition which we have encountered."

**OKLAHOMA** "With our Heil Dig - N - Carry scraper we are moving about 100 yards of material per hour on an average haul of 350 feet."

# HEIL DIG-N-CARRY PERFORMANCE RECORDS speak louder than words

The enthusiastic acceptance of Heil Dig-N-Carry scrapers is based on the obvious time saving and money making features built into this remarkable series of dirt movers—For instance: 1. A guaranteed, foolproof hydraulic system; 2. Correctly designed bowl and power operated front apron insures a heaping load in record time; 3. Hydraulically operated rear apron empties every load slick and clean; 4. Cut and spread indicator takes the guesswork out of scraper operation—Your nearest Heil distributor will welcome an opportunity to show you how you can save time and money with dependable Heil Dig-N-Carry scrapers—Fill in and return the attached coupon NOW!

## THE HEIL CO.

MANUFACTURERS OF WORLD FAMOUS HEIL HYDRAULIC DUMP UNITS  
FACTORIES — MILWAUKEE • WICHITA • MILWAUKEE • NEW JERSEY



THE HEIL COMPANY  
3800 W. Montross St., Milwaukee, Wis.  
Without obligation please send complete facts concerning Heil Dig-N-Carry hydraulic scrapers.

Name \_\_\_\_\_ State \_\_\_\_\_  
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# WOULDN'T YOU LIKE TO ADD A BUSINESS SCOUT TO YOUR STAFF *five days a week?*

Monday  
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**IMPORTANT  
CONSTRUCTION  
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*breaking every day*

Subscribers to McGraw-Hill *Construction Daily* have the jump on competing manufacturers.

They get news of proposed work in time for their salesmen to get in touch with the owners and the engineers.

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# 26 YEARS OF THIS KIND OF SERVICE



*Since 1912, a TEXACO Asphalt Concrete pavement has carried this traffic over Melan Bridge, Topeka, Kansas, requiring only slight maintenance.*

In a split-second, the camera accurately reveals traffic conditions to which this TEXACO Asphalt pavement has been subjected for more than a quarter-century. Asphaltic Concrete in type, it was constructed in 1911, using the existing pavement as base.

So successfully has this TEXACO Asphalt pavement on Melan Bridge, Topeka, Kansas, stood the years of traffic im-

pact that very little maintenance has been required to date.

The Melan Bridge pavement is typical of hundreds of thousands of square yards of quarter-century-old TEXACO ASPHALT paving, still giving excellent service, and necessitating a minimum outlay for repairs.



**THE TEXAS COMPANY, Asphalt Sales Department, 135 E. 42d St., New York City**

Chicago   Cleveland   Kansas City   Houston   Dallas   Buffalo   Philadelphia   Richmond   Boston   Jacksonville

# Taking the Switch at 3 miles a second



EASY as twisting a wire... the split ends of Cordeau-Bickford Detonating Fuse can be wrapped around the main line without the slightest trouble. The end of each branch line is slit back about four inches with the Cordeau splitter and opened up in the form of a

V. The main line is pressed *firmly* against the TNT in the fork, and the slit ends are wound *tightly* about it.

These connections, when made with reasonable care, will carry the lightening-swift detonating wave of Cordeau—traveling 17,500 feet per second—directly into each bore hole and into each cartridge.

## CORDEAU-BICKFORD

### Detonating Fuse

CB72

THE ENSIGN-BICKFORD COMPANY • SIMSBURY • CONN.

## These Buckeye

MACHINES  
ARE  
EXACTLY  
WHAT YOU  
NEED  
FOR  
1938  
ROAD  
WORK  
PROFITS

*Clipper*  
EXCAVATOR  
with METERED  
VACUUM CONTROL

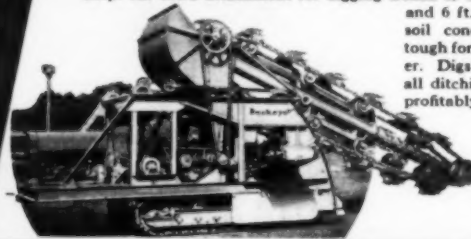


Assures instant response through finger-tip pressure, taking shovel operation out of manual labor field. Correct design. Rugged strength. For rough work or fine grading. A money maker for its owner.

MODEL 160 & 120 DITCHERS  
with SHIFTABLE BOOMS

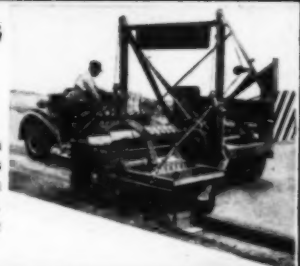
**Model 120** — Here is a ditcher that digs ditch where you want it — regardless of obstructions along the right-of-way. Gets close to buildings, poles, curbs. Maneuvers neatly in close quarters. Digs trench 16 in. to 30 in. wide and to 11½ ft. deep. Powered for tough going, and makes fast work when the going is easy.

**Model 160** — Not many ditching jobs come outside the range of this machine. Bigger, more powerful, than the 120, it digs trench from 16 in. to 42 in. wide and to 12½ ft. deep. An extra attachment for digging trench to 60 in. wide and 6 ft. deep. No soil condition too tough for this ditcher. Digs 75% of all ditching jobs—profitably.



HIGHWAY WIDENING  
MACHINES  
for Speed

Digs trench of uniform width and depth, leaving subgrades undisturbed, true to grade, clean and ready to receive material. Digs at rate of mile or more per day.



**Buckeye**  
Surface Material  
SPREADER  
for ACCURACY

Lays down exactly measured volume of material over every square yard of surface to be covered. Saves time, labor and material. Handles sand to 1½ inch stone and spreads volume from 4 square yards to 60 pounds per square yard. Helps make those spreading jobs profitable.



**BID THE  
Buckeye  
WAY**  
ask for our  
operation data  
before you  
bid

*The*  
**BUCKEYE**  
TRACTION DITCHER  
Company  
FINDLAY, OHIO

THE BUCKEYE TRACTION DITCHER CO., FINDLAY, OHIO

Send data and prices at once.

- ☐ Model 120 Ditcher
- ☐ Model 160 Ditcher
- ☐ Surface Material Spreader
- ☐ Highway Widening Machine
- ☐ Send a Sales Engineer

- Clipper Excavator
- ☐ Model 50—½ Yd.
- ☐ Model 60—¾ Yd.
- ☐ Model 70—¾ Yd.

- ☐ Shovel
- ☐ Trench Hoe
- ☐ Crane
- ☐ Clamshell
- ☐ Dragline

Date ..... 1938

Your Name .....

Company Name .....

City or Post Office .....

State .....



# 36% Greater Yardage on This Job!

## Here are the Figures!

Performance of this Link-Belt Model K-480 Speed-o-Matic Dragline, 2-yd. bucket, 75-ft. boom, Caterpillar Diesel engine. Operation —Strip Mining Anthracite Coal, Humboldt, Pa., as of November, 1937.

	Both Draglines Same Size	
	Lever-Control Dragline	Speed-o-Matic Dragline
Yds. overburden removed—7-hr. shift—Average	1650 yds.	2250 yds.
Coal loaded—Average	475 tons	650 tons
Increased production with Speed-o-Matic on Overburden (Approx.)		36%
on Coal (Approx.)		34%
Cost per 7-hr. shift	\$31.85	\$32.75
Cost per yd.—overburden removed	.0193	.0146
Cost per ton of coal loaded in trucks, including overburden removal	.138	.101
Saving per yd. of overburden		.0047
Saving per ton of coal		.037
Annual Saving \$4253.00—Based on 650 tons of coal per day and 260 working days per year, besides the greater profits due to increased production and the resulting savings accruing in fixed charges and general expense.		

● These are the actual cost figures on overburden removed and anthracite coal loaded by the Capparell Stripping & Const. Co., Humboldt, Pa.

They show, by direct comparison with costs on mechanical lever-operated draglines on the same job, that Link-Belt Speed-o-Matic hydraulic-pressure control pays big dividends by increasing production 36%. They also prove beyond question the superiority of the Speed-o-Matic principle . . . Link-Belt Speed-o-Matic shovels, draglines and cranes are not merely new and better machines—they are the basis of a new technique in handling materials at a profit . . . A Link-Belt shovel specialist will be glad to show more of these cost figures.

Link-Belt Company, 300 W. Pershing Road, Chicago. Distributors and Offices in Principal Cities. 7338-A



"I could go two shifts as easy as one!", says Paul Lindsay, veteran dragline operator on the Capparell job. "There's a lot of difference between flipping a small lever with one finger and pulling an old long lever."



Today you push a starter button on your car, drive farther and feel fresher at the end of the day. And, with Speed-o-Matic effortless control, you do more work with far less effort and still feel fresh at the end of the day.

Development of Speed-o-Matic puts manual-lever operated shovels back in the class of hand-cranked automobiles.



# LINK-BELT

## *Speed-o-Matic* SHOVEL DRAGLINE - CRANE

Get the last penny of profit  
from your Road Job...with

UNIVERSAL

# RELIANCE ROAD BUILDING EQUIPMENT



Reliance offers a complete line of Rock Crushers; Bucket Elevators; Revolving Screens; Scarifiers; Storage Bins; Pulverizers; Car Unloaders; Chip Spreaders; Heating Kettles; Bin Gates; Feeders; Belt Conveyers; Grizzlies; Air Separators; Sand & Gravel Spreaders; Wash Boxes.

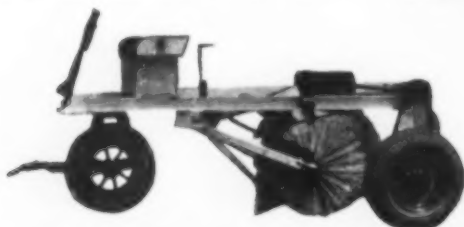


Here are just two items from the extensive Universal line. Their efficiency is typical of Universal Equipment throughout. You can get no better equipment at any price.

RELIANCE

## SAND & GRAVEL SPREADER

Spreads wet or dry. No rehandling, no loss of material. Any width from 8 to 60 feet. Will handle up to 60 tons an hour. A single machine has saved its cost nearly 10 times in one year... Spreads ahead of spreader and truck — 5 to 15 miles per hour. Equally valuable for both Winter and Summer use —



## Reliance 3 wheel Pneumatic Tired Sweeper — NEW!

1. Three wheel chassis provides 3 point suspension, short turning radius.
2. New method for raising and lowering broom, quick, easy positive control.
3. Broom mounted diagonally across frame, no counterweight required.

4. Frame all steel construction, lighter than other similar equipment.
5. The broom is engaged or disconnected through jaw type clutch.
6. Clutch firmly in position when operating broom.

send for bulletin

UNIVERSAL ROAD MACHINERY CO., NEW YORK, 114 LIBERTY ST.



Baker Bulldozer on Allis-Chalmers Tractor levelling fill on new West Side Express Highway on bank of Hudson River in New York City. Contractors, Elmburst Contracting Co.

BAKER BULLDOZERS  
ARE ONE OF THE  
MANY UNITS OF

GREAT STRENGTH, LONG LIFE,  
SIMPLEST CONSTRUCTION,  
TREMENDOUS DOWN PRESSURE,  
EASY, ACCURATE CONTROL



THE BAKER MFG. CO.  
568 Stanford Ave. Springfield, Ill.

# BAKER

## DIRECT LIFT BULLDOZERS AND GRADEBUILDERS

Send for Descriptive Bulletins  
on BULLDOZERS, GRADEBUILDERS  
and other Baker Products

**TOUGH or EASY—  
It's all the same  
to a Baker . . .**

What you want in a Bulldozer is the ability to handle the jobs as they come and do the work fast, easily and with a minimum of operating expense. The number of Baker Bulldozers on important construction jobs proves that they do just that. It makes a difference whether or not you use the simply-constructed, smooth-operating Baker on your job.



# LARGER LOADS REMOVED *with* GREATER SPEED

*...in light-weight trucks of*

**ALLOY  
NICKEL  
STEELS**



One of 300 Gar Wood refuse body units ordered by New York City Department of Sanitation. YOLOY Nickel-alloy-steel was specified for these units. View above shows part of last consignment on drive-away to New York City.



VITAL to the welfare of large and densely-populated cities is the quick removal of refuse by up-to-date and modern vehicles. Latest of these are the 300 units recently ordered from Gar Wood Industries by the City of New York.

Specified for the bodies is a high-tensile Nickel-copper-steel, Yoloy, produced by Youngstown Sheet and Tube Co., Youngstown, Ohio. In addition to a high strength-weight ratio, Yoloy provides a high degree of resistance to corrosion.

Yoloy, though possessing high strength and corrosion resistance, readily responds to the usual fabricating methods, including welding, and is moderate in cost. We invite consultation on problems involving the use of Nickel steel and other Nickel alloys.

**THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.**

**JUST ONE**

*of*

**MORE  
THAN 50  
WRENCH  
PATTERNS  
1000 SIZES**

*Williams'  
Structural  
Wrench*

**"SUPERIOR" WRENCHES  
OFFER  
SENSATIONAL STRENGTH**

Williams' "Superior" Wrenches, drop-forged from improved carbon steel, specially processed, are approximately twice as strong as old-fashioned carbon steel wrenches. Exhaustive tests show that all patterns and sizes average 93% as strong as corresponding Alloy Wrenches. They provide the greatest value ever offered as a standard line. 50 Patterns — over 1000 Sizes.

**J. H. WILLIAMS & CO.**  
2 Spring St., New York

Headquarters for: Drop-Forged Wrenches (Carbon and Alloy), Detachable Socket Wrenches, Reversible Ratchet Wrenches, "C" Clamps, Lathe Dogs, Tool Holders, Eye Bolts, Hoist Hooks, Thumb Nuts and Screws, Chain Pipe Tongs, Vises, etc.

**WILLIAMS**  
SUPERIOR DROP-FORGED TOOLS

TO AVOID  
BREAK-  
DOWNS  
AND LOST TIME  
ON THE JOB...

*Specify*

# GOODALL STEAM HOSE

**Efficient • Safe • Economical**

The way GOODALL Steam Hose meets all requirements for severe service fully justifies the time and money spent by the company during thirty years, to constantly improve their product for contractors' needs. On pile drivers, steam hammers, or any other type of steam hose installation, one of the following GOODALL brands will prove to be your best buy, from the standpoint of reliability, safety, and long, trouble-free service.

**"JUDSON"**

The old reliable hose with the red cotton jacket. Built to stand abuse.

**"INFERNO"**

An asbestos reinforced hose of rugged construction, for working pressures up to 200 lbs. and superheated steam temperatures up to 400° F. Noted for its great structural strength and the outstanding resistance of its rubber lining to the hardening effects of high temperatures.

**"'76"**

A super-quality unarmored hose for land rigs and general steam service. "'76", like the two described above, is a GOODALL "Standard of Quality" product . . . your guarantee of dependability, efficiency, and low ultimate cost.

*May we send you additional information?*

**GOODALL RUBBER COMPANY**

5 SOUTH 36th STREET, PHILADELPHIA, PA.

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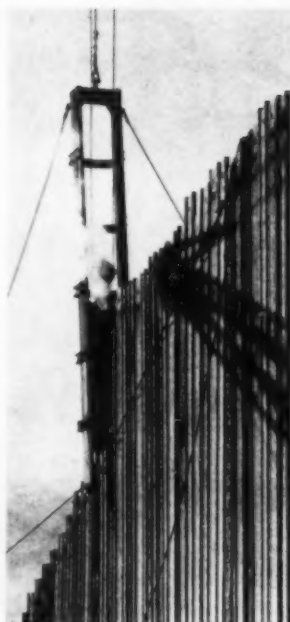
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**GOODALL MECHANICAL CORP.**

San Francisco • Los Angeles • Seattle • Salt Lake City • Phoenix

**GOODALL**

The originators of the  
"Standard of Quality" Line  
(Reg. U. S. Pat. Off.)  
of contractors rubber goods





**SAVE UP TO 40c PER HR. WITH DIESEL "SHIELD-ARC"**—This Lincoln welder combines a simplified Diesel drive and a 6-in-1 "Shield-Arc" for savings in fuel costs of 33% to 86%. Moderately priced. In many cases it pays for itself out of fuel savings alone. Get details today!

**FASTER TACKS**—With the 6-in-1 "Shield-Arc," you can get an arc especially suited to tack welding such as required for these reinforcement structures of spillway gate piers at Fort Peck Dam.

**FASTER REPAIRS**—You can set a 6-in-1 "Shield-Arc" for deeper penetration on heavy parts and make permanent repairs in half the usual time. In the case illustrated, the contractor saved several hundred dollars expense and a delay of 3 days for a power shovel by "Shield-Arc" welding the broken center drive gear. It was repaired in a few hours' time.

**FASTER FILLETS**—You can boost the speed of fillet welding such as required for this new mill building in San Francisco with the 6-in-1 "Shield-Arc" and the new "Fleetweld 8" electrodes. Users report more than 25% faster welding. Welded design of the building shown saved 30% in fabrication and erection costs.

## You can really **CUT** costs with this new **"SHIELD-ARC"** —to save thousands of dollars yearly

The JOB SELECTOR of a Lincoln "Shield-Arc" enables you to get better welds 15% faster by having your pick of any TYPE of arc. You can have an arc especially suited to overhead or vertical welding, one for high-speed, down-hand welding, one for hard-facing worn equipment, one for light-gauge metals and alloys, etc. It would take 6 special welders to equal the selectivity and range of a "Shield-Arc."

Users of the 6-in-1 "Shield-Arc" report savings of 15% to 50% in welding costs which result in savings of thousands of dollars yearly in construction and maintenance work. Mail the coupon today for details.

**LARGEST MANUFACTURERS OF ARC  
WELDING EQUIPMENT IN THE WORLD**

# LINCOLN

**THE LINCOLN ELECTRIC COMPANY**  
Dept. G-486, Cleveland, Ohio

Send a free copy of booklet on ☐ 6-in-1 "Shield-Arc" ☐ Diesel "Shield-Arc" ☐ Welding and hard-facing procedure guide.

Name \_\_\_\_\_

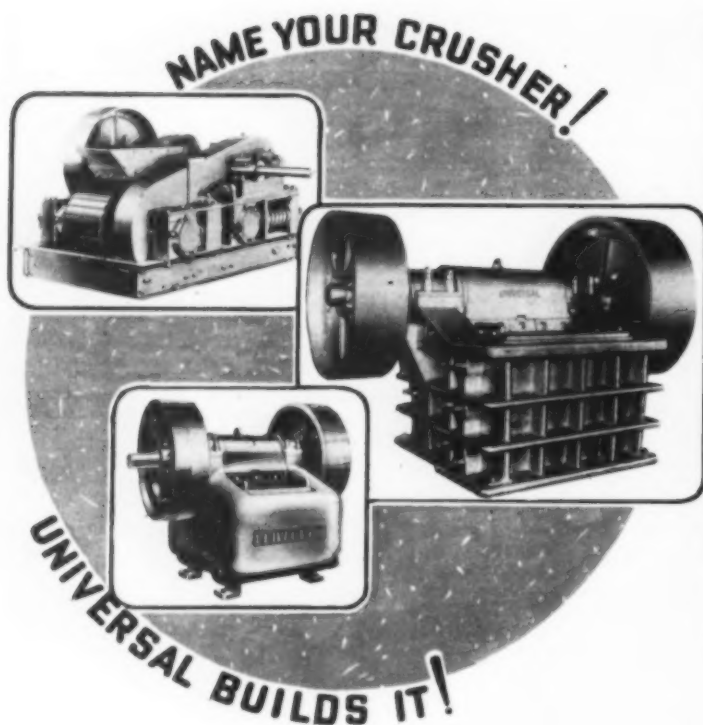
Position \_\_\_\_\_

Company \_\_\_\_\_

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City \_\_\_\_\_

State \_\_\_\_\_



Stationary or Portable, Primary and Secondary Jaw Crushers, with bronze or roller bearings, in sizes to meet every crushed stone and gravel requirement. Roll Crushers for secondary crushing; Portable and Semi-Portable Crushing Plants; Trailer Type Crushers, tractor-driven from power take-offs; Portable Apron Conveyor Feed Crusher Units; and, of course, the new Universal No. 1016 Heavy-Duty, Light-Weight Crusher. Just name your needs—if it's modern, low cost crushing equipment, Universal builds it! Send for complete new literature files!

Universal was the leader in the development of the over-head eccentric force feed crusher and has contributed many important developments since then — such as the new Universal No. 1016 Crusher which combines unusual lightness with greater strength. It is only natural that Universal engineers be looked upon as leaders in the field, and it is good business to select your crusher from a firm with such a background as only Universal has.

**UNIVERSAL CRUSHER COMPANY**  
327 Eighth Street West  
Cedar Rapids, Iowa

# UNIVERSAL

# JUST PRESS THE BUTTON



# FOR INSTANT AIR POWER



SCHRAMM 105 DeLuxe "Utility" Compressor. Inset showing instrument panel with gauges and starting button.

**WINTER STARTING HAS ITS PROBLEMS!** Think what it will mean to start your compressors as quickly, easily, safely as you do your automobile. Think of the time saved, the safety to workmen and the saving in wear on your compressor. SCHRAMM "Utility" Compressors give you built-in electric starting on every size and model. No extra cost. Just push the button — SCHRAMM "UTILITY" STARTS!

Write for SCHRAMM Bulletin 3700-CJ.  
SCHRAMM INC., West Chester, Penna.

# SCHRAMM

## AIR COMPRESSORS



# WE MACWHYTE MEN ARE ALWAYS

*on the  
alert!*



LOOK FOR THE  
*Whyte Strand*

MACWHYTE  
WHYTE STRAND  
IS BETTER  
BECAUSE IT'S MADE  
BY SPECIALISTS

**MACWHYTE  
COMPANY**  
KENOSHA, WISCONSIN  
Manufacturers of wire rope and  
braided wire rope slings.  
Distributors and stock throughout  
the U. S. A. for quick service.

NO. 321A

● "We don't find trouble often," says Walter Bloxdorf, veteran Macwhyte metallurgist, "but when we do, even though it's the smallest defect, we discard the whole coil of wire. It's never used in making Macwhyte Wire Rope."

"As soon as rods arrive at the Macwhyte Wire Mill we make our first laboratory tests. We examine their grain structure and size under the microscope. We determine the proportion of elements by chemical analyses. And then we give rods a hot acid test, which shows up any impurities."

"But that's only the first lab test, the easy test. After rods have been sent through heat-treating, 'pickling' and cold-drawing in the wire mill, they come back again to the lab for further testing—including fatigue resistance tests, torsion tests, and tests of tensile strength."

"Any wire that can pass all these tests is really good wire—wire that makes Whyte Strand PREformed wire rope stand the toughest going."

## MACWHYTE

*Whyte Strand - PREformed*

THE WIRE ROPE WITH THE INTERNAL LUBRICATION

# Make Idle Hours **PAY!**



Slack periods between your larger jobs become a source of profit with a **MICHIGAN TRUCK SHOVEL-CRANE**. The truck-mobility and economy of the **MICHIGAN**, plus its quick-change to **DRAGLINE**, **CLAM** or **TRENCH HOE**, enables you to take **profitable** advantage of several "in-between" jobs at a time. . . . And the **MICHIGAN** is always ready for steady work as well, where its high operating speed means **real production**.

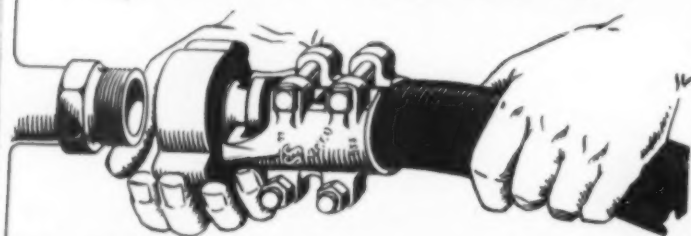
Get the complete facts on the versatile  $\frac{1}{2}$  yd. and  $\frac{3}{8}$  yd. **MICHIGAN TRUCK SHOVEL-CRANE**.

WRITE FOR  
BULLETIN "CM"



**MICHIGAN POWER SHOVEL & CRANE CO.** BENTON HARBOR, MICHIGAN, U.S.A.

## HERE'S HOW...



TO STOP LEAKS AND MAKE HOSE LAST LONGER!

Make Your Hose Connections With

## "BOSS" COUPLINGS

The Recognized Leaders for High or Low Pressures . . . on Steam, Air or Liquid Lines

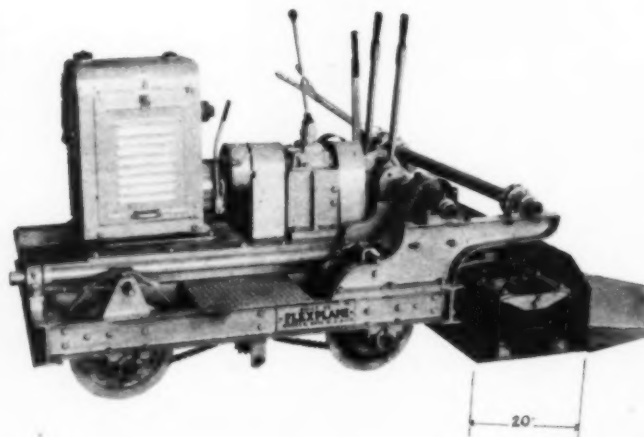
Regardless of how they are used, "BOSS" Couplings constantly demonstrate their unequalled dependability and economy. They save money two ways — by eliminating leaks, pressure losses and shutdowns, and by being extremely "easy" on the hose, despite their bull-dog grip. All parts are steel or malleable iron, to withstand abuse, and Cadmium Plated to prevent rust. It will pay you to specify "BOSS" Couplings every time you order hose.

**DIXON**  
VALVE & COUPLING CO.

Los Angeles PHILADELPHIA Houston

Carried in Stock by Leading Rubber Manufacturers and Jobbers

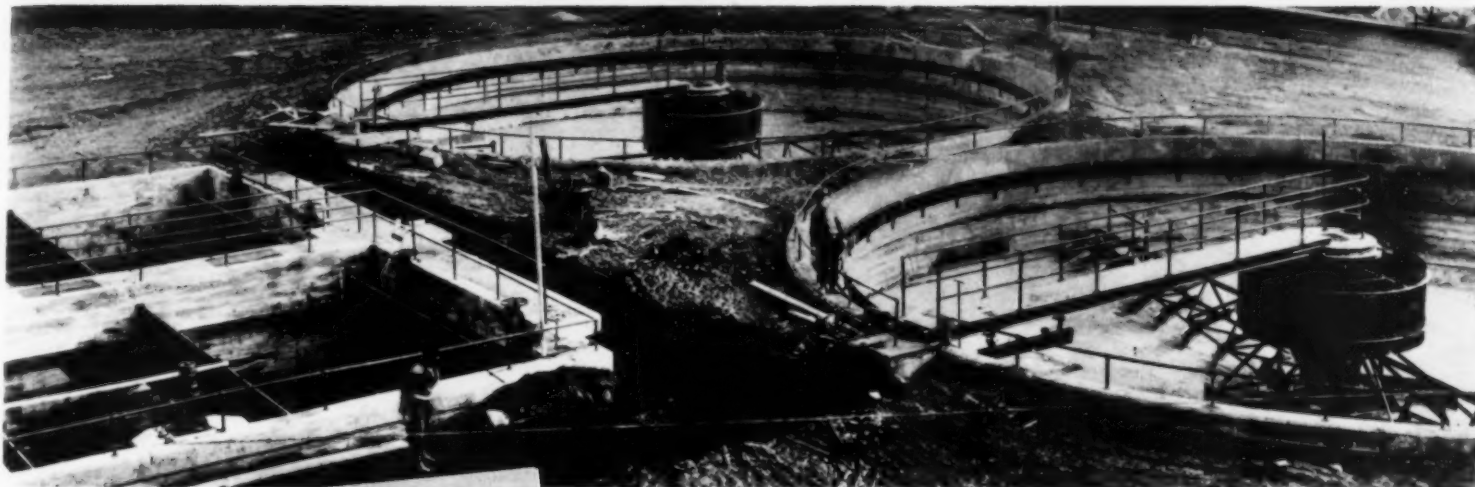
## "WIDENINGS"



Noting the demand for small size finishing machines, we are taking care of this demand by making a small unit complete in every detail with 20" wide screed. This speedy little machine has been found extremely useful by all who have used it.

**FLEXIBLE ROAD JOINT MACHINE CO.**  
WARREN • OHIO





*The use of calcium chloride in the concrete made it possible to place the concrete for these tanks as one continuous job.*

# THE IMPORTANT INGREDIENT FOR FASTER • SAFER CHEAPER STRONGER CONCRETING

## WRITE FOR DETAILS

Find out what calcium chloride can do for YOUR concrete. Write today, to any of the firms listed below.

Solvay Sales Corporation  
40 Rector St., New York City  
The Columbia Alkali Corporation  
Barberton, Ohio  
The Dow Chemical Company  
Midland, Michigan  
Michigan Alkali Company  
60 E. 42nd St., New York City

MAIL  
THE COUPON

The Barberton Sewage Treatment Plant is but one of hundreds of structures which have been built faster, easier and more economically through the use of calcium chloride in the concrete. Constructed during the winter of 1937-1938, the project moved along smoothly, without interruption, right through the cold-weather months.

Tests by the National Bureau of Standards have shown that the addition of 2 percent of commercial calcium chloride per sack of standard Portland cement increases the flowability of concrete by as much as 41 percent and that concrete containing this admixture attains safe strength in less than half the time otherwise required. These advantages—brought out convincingly on this Barberton

project—permitted moving the forms so rapidly that the tanks were poured as one continuous job.

The use of calcium chloride in concrete produces a "fatter" better-lubricated mix that fills forms more evenly and more completely. Volume change is minimized, a smoother finish assured, and concrete of higher ultimate strength is secured.

The substantial savings in time and labor—plus the higher quality of concrete obtained—make the use of calcium chloride equally advantageous during summer or winter. Every season, more and more contractors, highway builders and other construction officials are proving to themselves that calcium chloride is a valuable aid to better concreting.

*Main building of the municipal sewage treatment plant constructed at Barberton, Ohio, during the winter of 1937-1938.*



## CALCIUM CHLORIDE FOR MODERN CONCRETE CURING

CALCIUM CHLORIDE ASSOCIATION, 4145 Penobscot Building, Detroit, Michigan.

Kindly send me the bulletins checked:

☐ C. C. A. Bulletin No. 35—"Better Concrete Curing, High Early Strength and Cold Weather Concreting." including A. S. T. M. specifications

☐ Report of U. S. Bureau of Standards, (reprinted from Highway Research Board Proceedings).

☐ Data on use of dry flake calcium chloride with materials in mixer skip.

☐ Report of American Road Builders' Association Bulletin No. 42

and special information on \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_



**For quick deliveries  
of reinforcing bars  
...order from  
Bethlehem warehouses**

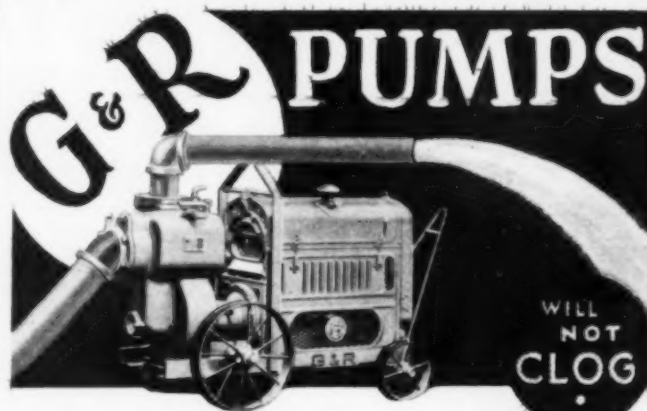
When you need reinforcing bars in a hurry, whether your requirements are large or small, you can count on Bethlehem for prompt deliveries. Warehouse stocks in key cities throughout the country are at all times adequate to meet any demands. Your order is sped on its way, insuring against costly delay of your work from steel not being on hand when needed.

Our Reinforcing Bars have the uniform, evenly spaced deformations that make for excellent concreting qualities. They can be supplied plain, deformed or special in squares or rounds.

A 'phone call or a postcard to the Bethlehem district office nearest you will bring you detailed information on Bethlehem's warehouse service.

**BETHLEHEM STEEL COMPANY.** General Offices: Bethlehem, Pa., District Offices: Albany, Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Honolulu, Houston, Indianapolis, Kansas City, Mo., Los Angeles, Milwaukee, New Haven, New York, Philadelphia, Pittsburgh, Portland, Ore., Salt Lake City, San Antonio, San Francisco, St. Louis, St. Paul, Seattle, Syracuse, Toledo, Washington, Wilkes-Barre, York. Export Distributor: Bethlehem Steel Export Corporation, New York.

**BETHLEHEM STEEL  
COMPANY**



Claims of fastest priming, highest suction lift, more gallons per minute, etc., do not pump water. On the job, the pump must do its own talking, and with dirty water, many a pump is inclined to stutter—and stop.

Let G & R Pumps tell you their own story on any job. They will deliver as much, and usually more, water under any condition, than any other pump. We will ship you one and let you be the judge.

Remember this about G & R Pumps — **THEY WILL NOT CLOG — THEY ASK NO TIME OUT.** Play safe! Try a G & R Self-priming Centrifugal before you buy any pump this year.

Distributors in 100 principal cities are ready to make prompt delivery of the G & R Pumps you need.

**The Most DEPENDABLE Pump for The Least Money**

**THE GORMAN-RUPP CO. Mansfield, Ohio**

**Answers to your  
problems in structural engineering  
always at your  
finger tips**

EVERY man concerned with the design and construction of civil engineering structures of any type should have these practical books with their helpful tables, diagrams, reference data, best methods and details.

Under the general editorship of George A. Hool, formerly Professor of Structural Engineering, University of Wisconsin; and W. S. Kinne, Professor of Structural Engineering, University of Wisconsin, Editors-in-Chief of the Library, Sixty-Six of the leading, practical operating structural engineers of the United States and Canada give you the very cream of their knowledge of structural engineering.

**Hool and Kinne's  
Structural Engineers' Handbook Library**

They give you six well bound, fully illustrated volumes, containing 3,575 pages of practical, authoritative information covering every phase of structural engineering from foundation and substructure work to the completed erection.

The six books are: — 1. Foundations, Abutments and Footings. 2. Structural Members and Connections. 3. Stresses in Framed Structures. 4. Steel and Timber Structures. 5. Movable and Long-Span Steel Bridges, and, 6. Reinforced Concrete and Masonry Structures. With these books on hand you cannot make mistakes.

By placing this Library on your bookshelf you are putting within arm's reach years of actual first rate experience with structural problems. Do not forget either, that these men are all EXPERTS in their lines.

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Address \_\_\_\_\_

Position \_\_\_\_\_

City and State \_\_\_\_\_

Company \_\_\_\_\_

(To insure prompt shipment, write plainly and fill in all lines.)

CM-5-38



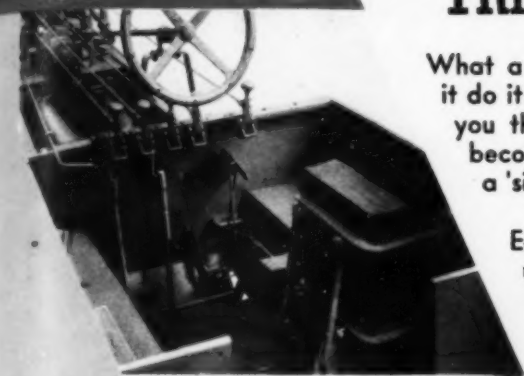
# Let's Take It Apart

## This Galion Motor Patrol Grader

What a machine will do is important, of course . . . but what makes it do it day after day is equally important. For that reason we show you the vital parts of Galion motor graders. We want you to become better acquainted with them . . . to know that it isn't a 'sight un-seen' proposition when you specify Galion graders.

Each part is dependable, of equal quality and produced under the same precision standards at our factory. Put these parts altogether and they mean a grader which is designed and constructed to give almost effortless operation without risk of failure or excessive cost.

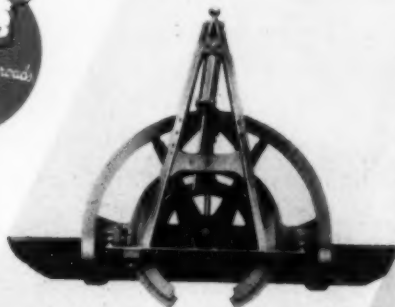
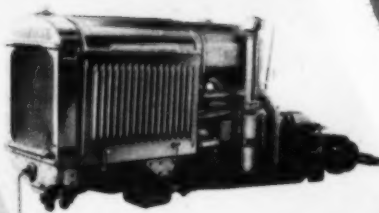
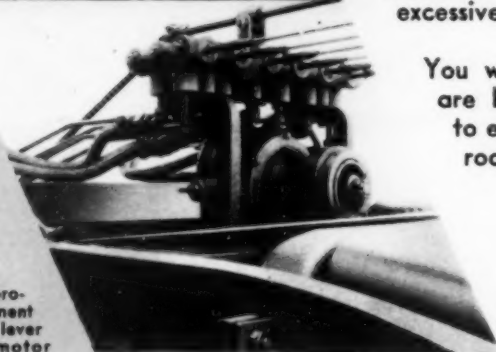
You will like the way Galion graders are built . . . the way they respond to every test in road maintenance, road widening and road building.



Hydraulic control provides instant adjustment at the touch of a lever making Galion motor graders almost effortless in operation.

A simple, dependable hydraulic system (center) designed to give long and trouble-free service. Oil pump is driven by V-belt and same pressure is maintained at all working speeds.

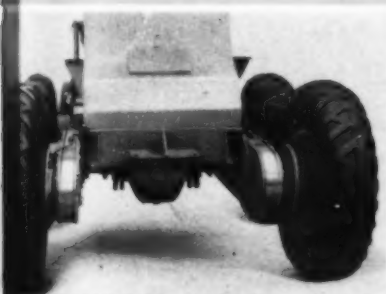
A choice of four power units (the McCormick-Deering I-30 is illustrated — right). Diesel, gasoline or kerosene operation.



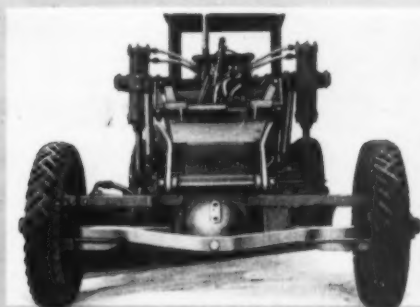
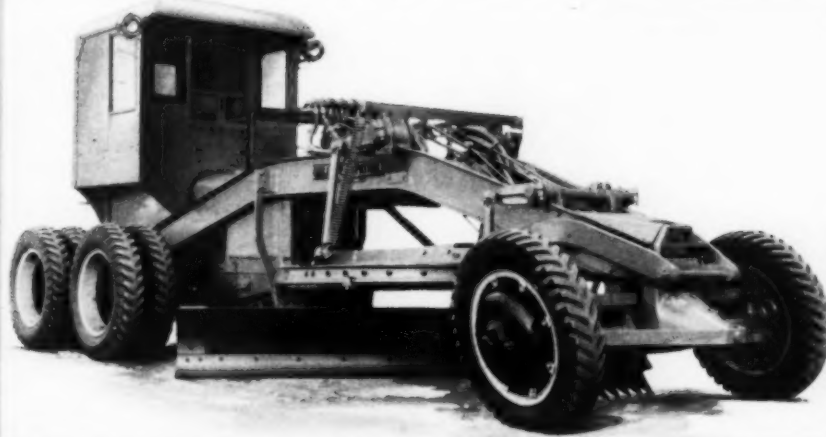
Heavy duty steering mechanism (top) makes Galion graders as easy to steer as a truck. Steering gear is centrally mounted inside the frame for protection.

Powerful moldboard and blade assembly (center) is powerful with ability to withstand the severest kind of service. Wide range of pitch adjustments provided.

The circle (left) has full reverse adjustment and is securely clamped in adjustable guides and clamps, offering an absolutely chatterproof assembly.



Ample traction is insured by the Galion double drive. All four wheels do their full share of work under any condition. Axle is centered between the wheels, permitting them to follow ground irregularities and pass over obstacles with each wheel always in full driving contact.



A choice of wide front axle with straight wheels or wide front axle with leaning wheels. The wide front axle gives better distribution of weight, greater stability and resistance to side pressure. Leaning wheels are especially advantageous for ditching work.

Galion motor graders will give you reliable performance with low maintenance cost. Contributing much to this dependability and uninterrupted service are: a simple, dependable hydraulic system; heavy duty steering mechanism; strong frame and chassis; sturdy draw bar and circle assembly; powerful moldboard and blade; choice of power unit, weight and final drive.

Compare Galion motor graders with others . . . you will find they have the ability to do more work, better work, faster work and more kinds of work with greater economy. You will like the way perfect balance is maintained in the finished machine . . . the way Galion graders are built to produce results. Send for Catalog No. 200.

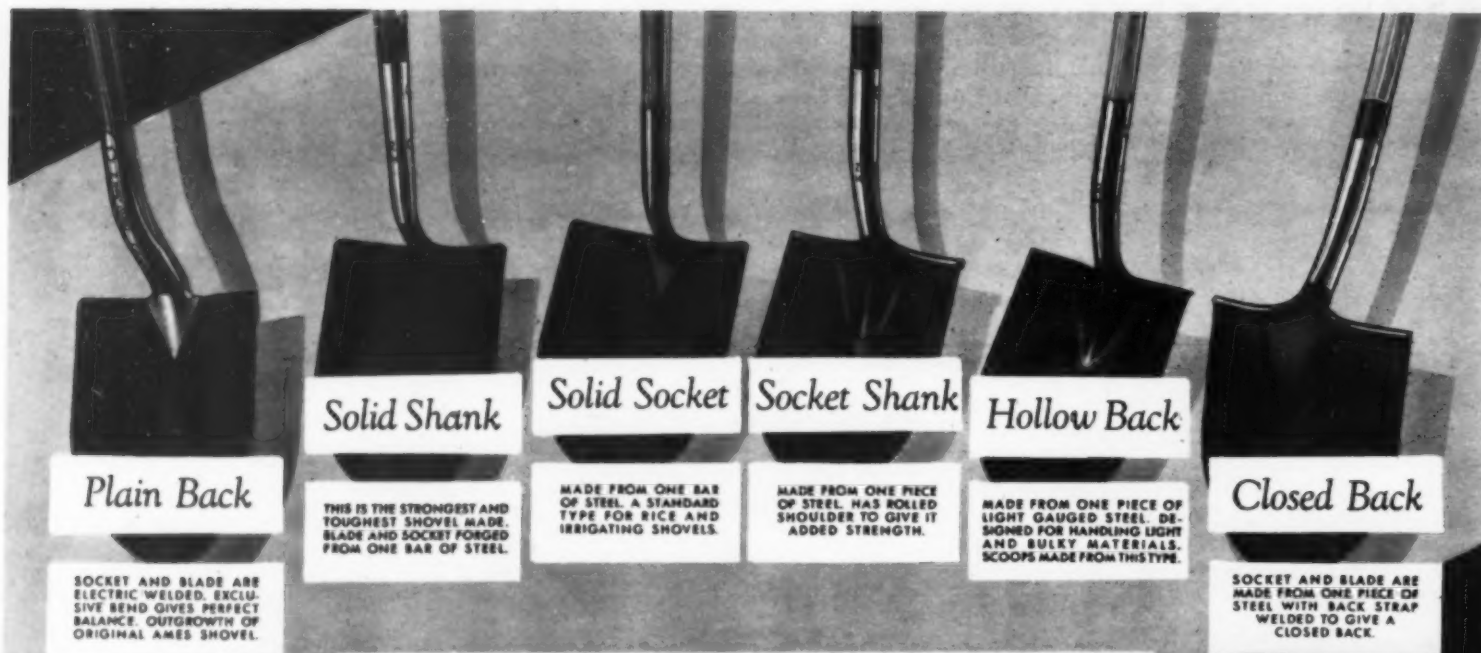
## THE GALION IRON WORKS & MFG. COMPANY

Head Office and Works: Galion, Ohio

Export Division: Columbus, Ohio

PULL TYPE GRADERS • ROLLERS • SPREADERS • ROOTERS

## THE SIX BASIC TYPES OF ABW SHOVELS



SINCE  
1774



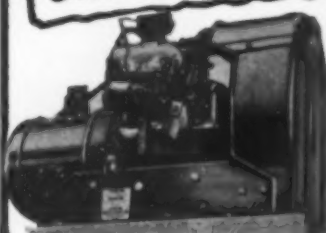
From these six basic types, ABW produces any style shovel, spade, or scoop to meet the customer's requirements. The ABW Line is the most complete line of shovels, spades and scoops manufactured . . . Ask your jobber.

★ ★ ★

AMES BALDWIN WYOMING CO.  
PARKERSBURG, W. VA. • NORTH EASTON, MASS.

• ABW PRODUCTS •  
SHOVELS • SPADES • SCOOPS  
FORKS • HOES • RAKES  
• POST HOLE DIGGERS •  
AGRICULTURAL HANDLES

For Portable, Dependable  
Electric Power and Light  
**Choose DELCO-LIGHT**



This Model—1500 watt—110 volts DC . . . starts and stops automatically on load demands. 2-cylinder 3 H. P. water-cooled engine. Other models available 150 to 6000 watts—hand-operated batteryless, automatic, or remote control types.

### EASY PAYMENT TERMS

capacities to suit your needs. AC or DC. Ask your local Delco-Light dealer for full details on these efficient power and light plants. No obligation.

**UNITED MOTORS SERVICE INC.**  
General Motors Building Detroit, Michigan  
PRODUCT OF GENERAL MOTORS

UNITED MOTORS SERVICE INC. Name \_\_\_\_\_  
General Motors Building, CM-6 Address \_\_\_\_\_  
Detroit, Michigan Town \_\_\_\_\_  
Please send me complete information on Delco-Light plants. State \_\_\_\_\_

• Ideal electric service for portable, stationary, or standby requirements on building jobs. Easy to set up, move, operate. Turn on Delco-Light electric power when and where you need it. Saves money—new models operate at lowest costs in history.

Available in a wide range of sizes and capacities to suit your needs. AC or DC. Ask your local Delco-Light dealer for full details on these efficient power and light plants. No obligation.



## WITH MORETRENCH EVERY JOB IS DRY

*There are many reasons*

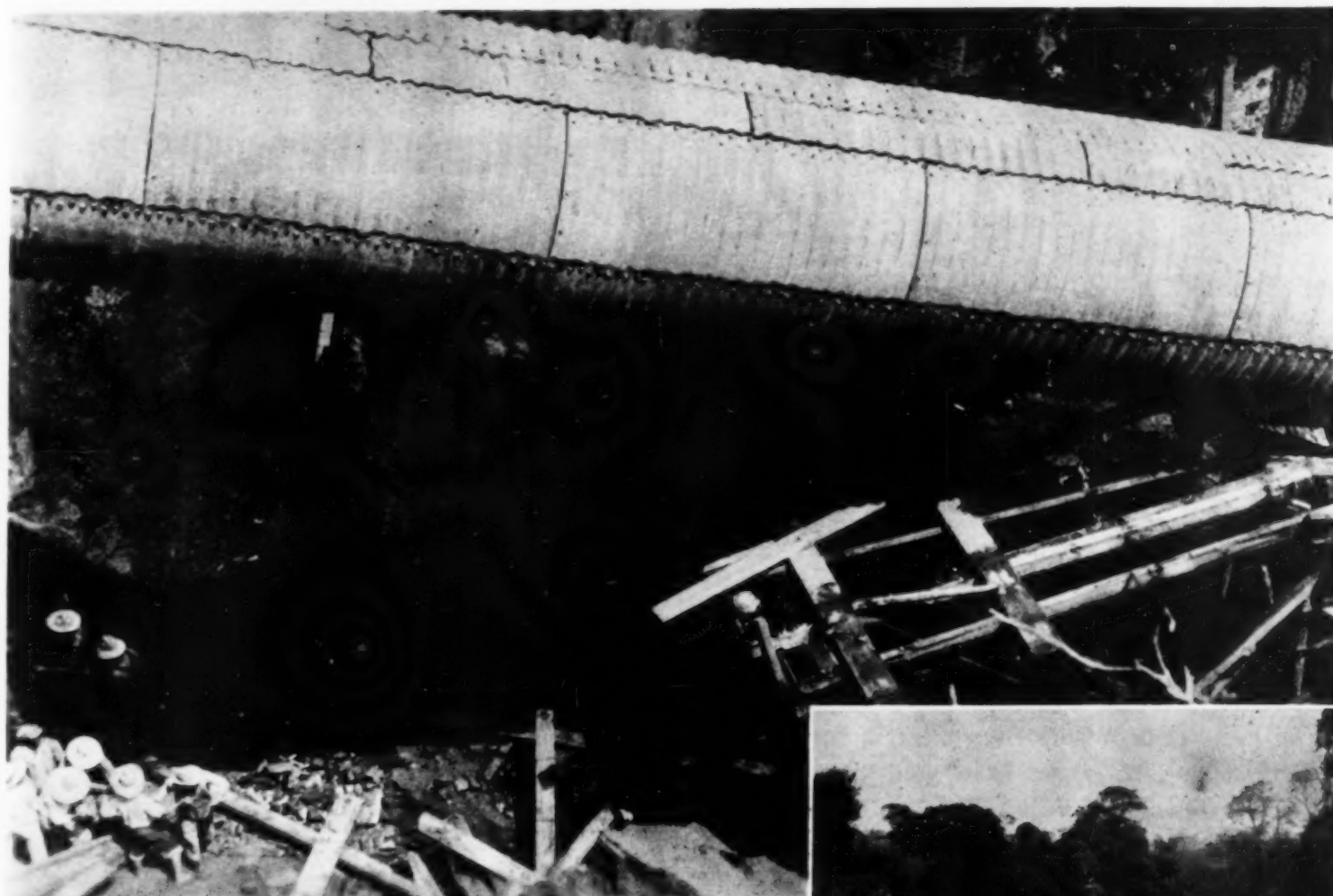
Tidewater level at the surface, but—a 100% Moretrench Wellpoint System changed all that. You can buy, you can rent, or you can contract with us to take the water out at a definite fixed sum. Phone Barclay 7-0463.

**MORETRENCH CORPORATION**  
Sales and Rental Office: 90 WEST ST., NEW YORK



# UNDERMINED FOR 70 FEET

**YET IT SAGGED ONLY 2 INCHES!**



## LARGE MULTI PLATE SEWER OUTFALL OK AFTER RECORD CLOUDBURST

• Here is another striking example of money and grief saved by Armco Multi Plate. During the erection of this 97½-inch diameter pipe, a torrent of water gushed down through the ravine, tearing out almost 70 feet of the supporting trestle.

Despite this long span of heavy pipe flowing full of water for several days, it sagged only 2 inches. Moreover, the special water-tight joints didn't leak a drop under this severe test. That's the kind of performance Armco Multi Plate offers you in the design of large drainage and sewer lines. Write for complete information. Armco Culvert Manufacturers Association, Middletown, Ohio.



## ARMCO MULTI PLATE



A PRODUCT ORIGINATED AND DEVELOPED BY ARMCO ENGINEERS

May, 1938 — CONSTRUCTION Methods and Equipment — Page 99

YOU  
CAN  
ALWAYS  
SAY

**No,**  
*thanks!*

If you have any wall construction problem — immediate or contemplated — you ought to look into RICHMOND TYING DEVICES for the concrete work.

For RICHMOND FORM-TIES — aside from offering you the advantage of a full refund on every cent of your investment in form-tie accessories — cut days from your time and labor schedule, shave many dollars from immediate as well as ultimate cost, assure you not only greater strength and dependability, but the correct tying system for your job. And to write in for full details with respect to your particular problem will bring an answer which we think will prove our contention to your complete satisfaction.

If, for one reason or another, our ideas on tying devices are not in line with your own, you can always say, "No, thanks!" But if you don't investigate you can never be sure you've made the best buy.

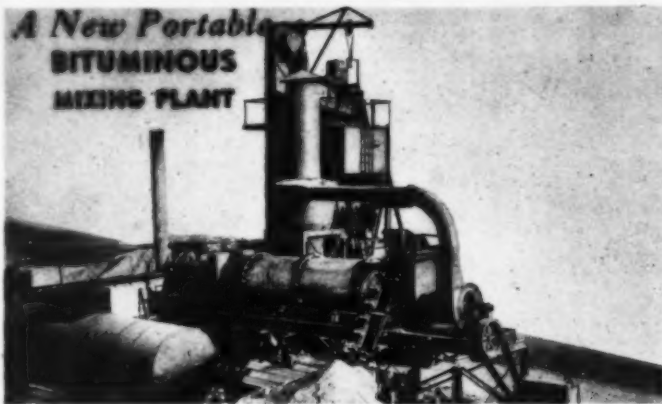
*How about getting that letter off to us today? Just give us an outline of your problem.*

**RICHMOND  
SCREW ANCHOR  
CO., INC.**

*Tying Devices for Concrete*

241-251 BUSH STREET  
BROOKLYN, NEW YORK

**A New Portable  
BITUMINOUS  
MIXING PLANT**



## FOR MODERN ROADWORK

### ... at Low Cost

This plant was designed to meet the demand for the economical improvement of secondary roads. We have built several to date and they have proved their worth in actual service. No investment is needed for a running gear, plant adapted to standard flat bed truck and trailer hauling.

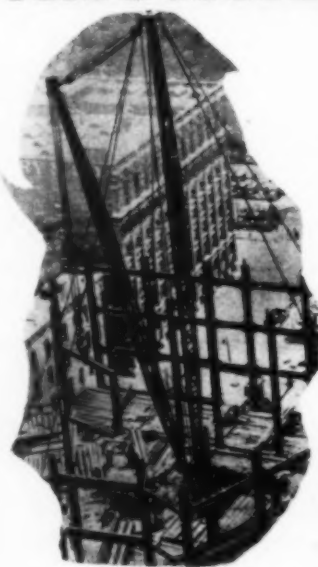
#### Some Details

- Can be erected by 3 or 4 men in a few days.
- No erection equipment required. Plant equipped with hoist and jib crane.
- Built in 2 units (dryer unit; and screening and mixing unit).
- Comply with most highway loading and clearance regulations.
- SKF bearings throughout. Fully enclosed vibrating screen. Steam-jacketed, steam-operated steel mixer. Large combustion chamber and dust collector.
- Write for Bulletin T-258.

**HETHERINGTON & BERNER, INC.**  
701-745 Kentucky Avenue  
Indianapolis, Ind.

TRADE MARK  
**DOBBIE**  
ESTABLISHED 1862

## All Steel DERRICKS



Steel Erectors Guy Derrick,  
with Ball Bearing Footblock.

### Guarantee Safety

When you guarantee safety, you economize — for safety means uninterrupted operation and lowest possible maintenance costs.

And DOBBIE All-Steel Derricks have been designed for safety and consequent economy. They have a safe load capacity of almost twice their rating. You need this assurance of dependable safety and continuous performance.

SAVE POWER BY USING BALL OR ROLLER BEARING FOOTBLOCKS AND SHEAVES. Built in both Guy and Stiff-leg types. Write for information and prices.

**DOBBIE FOUNDRY & MACHINE CO.**  
Niagara Falls, N. Y.

Other Dobbie Products—Steel Derricks, Timber Derrick Fittings, Hand Winches, Motor Driven Winches, Blocks, Sheaves, etc.

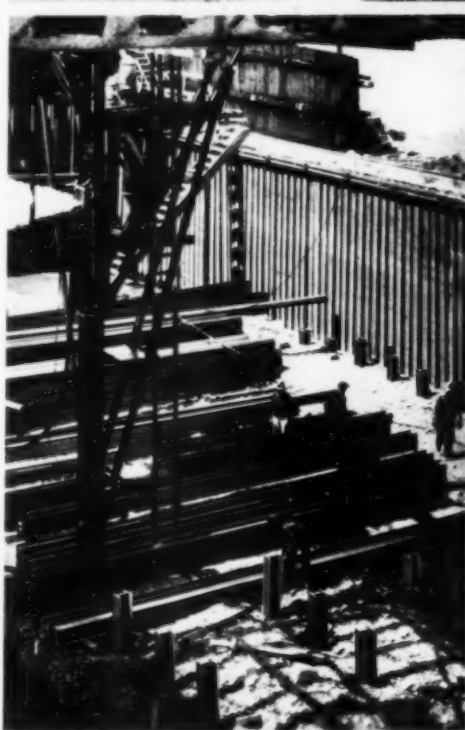


# EVERY JOB *is different*

*True enough — yet Engineers say: "U·S·S STEEL BEARING PILES prove practical and economical on such widely different jobs as these."*



**DOUBLE PURPOSE** Note the perfect alignment and simplicity of this trestle in Clay County, Florida. Here in an effective double purpose design U·S·S Steel Bearing Piles act both as bearing piles and trestle bent columns.



**HORIZONTAL LOAD RESISTANCE** In addition to heavy vertical loading 6 tons of lateral loading per pile must be safely carried by the foundations for Emsworth Dam on the Ohio River. Engineers chose U·S·S CBP Steel Bearing Piles because of their high resistance to combined stresses. They proved practical and easy to drive.

**W**HEREVER the following conditions obtain, economical and practical considerations are usually better served by U·S·S Steel Bearing Piles.

1. **HEAVY LOADING.** U·S·S Steel Bearing Piles will carry loads as high as 100 or more tons per pile when driven to refusal or in firm soil through overlying low value soils.
2. **DIFFICULT PENETRATION.** U·S·S Steel Bearing Piles can be driven to desired levels through subsoils where other types of piles could not even be considered.
3. **DOUBLE PURPOSE.** A single U·S·S Steel Bearing Pile may combine the functions of a bearing pile below and a column above—one pile—one operation. They are particularly suited to trestle bents.
4. **CLOSE PILE SPACING.** U·S·S Steel Bearing Piles reduce soil displacement when close spacing is required:
  - (a), between adjacent piles to support

heavy superimposed loads;

- (b), between old and new piles in foundation restoration for old structures;
- (c), between new piles and old foundations where ground disturbance must be avoided.

5. **INSECT DAMAGE DANGER.** Where costly damage to structures by marine borers and termites is a hazard, U·S·S Steel Bearing Piles offer effective protection.

6. **HORIZONTAL LOADING.** To withstand flood-borne loads and impacts and lateral shocks, experience dictates the choice of U·S·S Steel Bearing Piles.

U·S·S Steel Bearing Piles are money savers. Contractors tell us they are easily spliced and handled in the field, eliminate jetting, require less storage and shipping space. High unit loads permit fewer piles and driving operations. The wide piling experience of Carnegie-Illinois engineers is yours for the asking. Let them know your job conditions.

## U·S·S STEEL BEARING PILES

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh



Chicago

Columbia Steel Company, San Francisco, Pacific Coast Distributors

United States Steel Products Company, New York, Export Distributors

# UNITED STATES STEEL

# GRAPPLES Owen Buckets

Investigate  
the  
Revolutionary  
New  
Combination  
GRAPPLE  
and  
ORANGE  
PEEL  
BUCKET



Write  
for the  
**NEW  
CATALOG**

for Dredging

Rehandling

Excavating



A MOUTHFUL  
AT  
EVERY  
BITE

**THE OWEN BUCKET CO.**

6020 BREAKWATER AVE., CLEVELAND, O.

Branches: New York • Philadelphia • Chicago • Berkeley, Cal.

## PICK CMC FOR PROFITS!

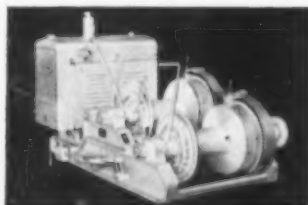
You can't go wrong on any piece of equipment in this new CMC Line. It is built right and priced right to make money for you. CMC Equipment is 100% efficient yet is priced to give you the most for your money. Get our new catalog.



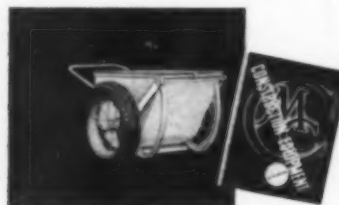
• CMC New Streamlined, Fast Moving Two-Wheel Trailers in 5s, 7s and 10s sizes.



• CMC New Dual Prime Pumps 1 1/4 to 4". Faster priming — higher pumping efficiency.



• CMC General Utility Double Drum Hoist, 100% hoist efficiency without extravagance in cost.



• CMC Dumpover Pneumatic Tired Carts — Faster material handling at lower cost.

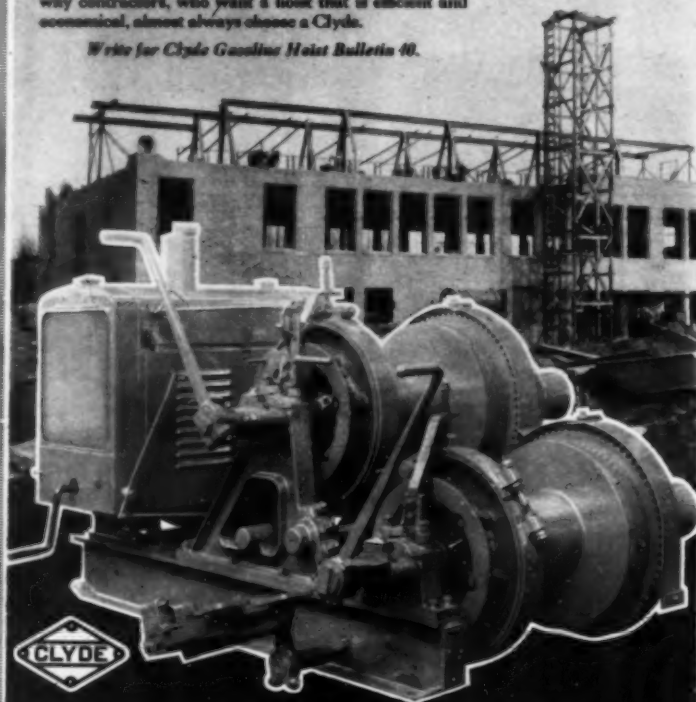
**CONSTRUCTION MACHINERY COMPANY**

Waterloo, Iowa

## From one job to another!

Always dependable . . . always capable. Whether it's handling a material elevator on one job; driving piles on another; operating a derrick; setting steel or any other kind of work . . . it's all the same to a Clyde Gasoline Hoist. Compare the specifications of Clyde hoists; study their design and principles of construction. You'll know why contractors, who want a hoist that is efficient and economical, almost always choose a Clyde.

Write for Clyde Gasoline Hoist Bulletin 40.



**CLYDE IRON WORKS, INC.**

DULUTH - MINN.

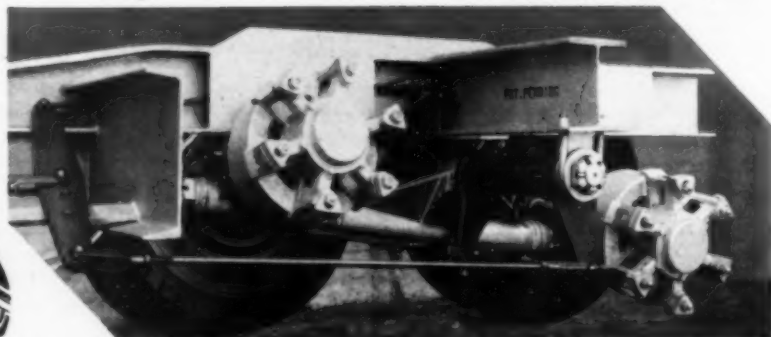
## NEW EQUALIZING BRAKES assure faster and safer trips

• Brake "grab" and brake "walk" formerly encountered in trailer brakes have been entirely eliminated in the new Rogers system of equalizing brakes.

Compensating levers keep all brakes in constant readiness for instant and effective application and release, regardless of extreme oscillation of the wheels laterally or longitudinally.

For faster and safer operation under all conditions of road and load, buy a Rogers Trailer.

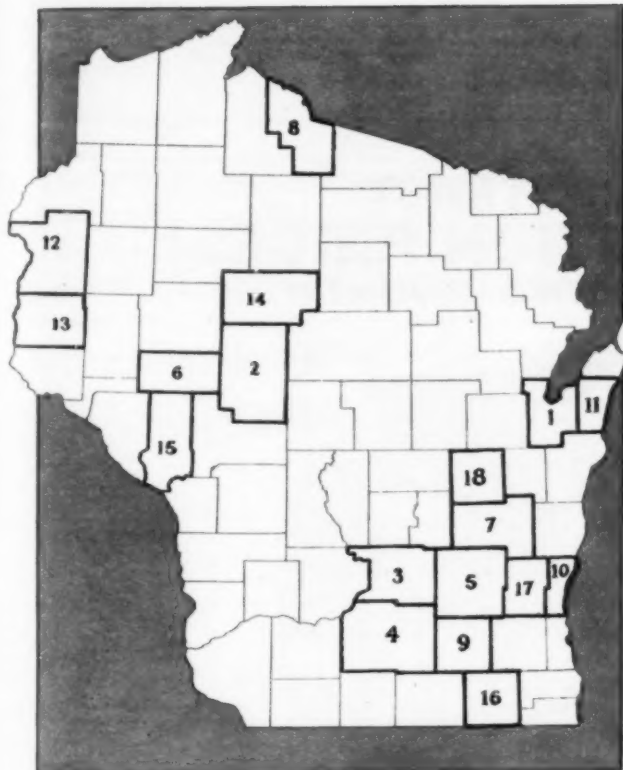
**ROGERS BROTHERS CORPORATION**  
220 Orchard St. • ALBION, PENNA.



PATENT APPLIED FOR



# Badger State builds better roads cheaper with *Continentials!*



County Highway Departments	Model
1 Brown . . . . .	CS7A
2 Clark . . . . .	CS7A
3 Columbia . . . . .	CS5B
Columbia . . . . .	CS7A
4 Dane . . . . .	CS7A
5 Dodge . . . . .	CS10A
6 Eau Claire . . . . .	CS4B
7 Fond du Lac . . . . .	CS7A
8 Iron . . . . .	CS5A
9 Jefferson . . . . .	CS7A
10 Ozaukee . . . . .	CS7A
11 Kewaunee . . . . .	CS7A
12 Polk . . . . .	CS7A
Polk . . . . .	CS7A
Polk . . . . .	CS7A
13 St. Croix . . . . .	CS4A
14 Taylor . . . . .	CS5A
15 Trempealeau . . . . .	CS7A
16 Walworth . . . . .	CS7A
17 Washington . . . . .	CS7A
18 Winnebago . . . . .	CS7A

This list includes Continentals owned by Counties only.

Sold and serviced by Allis-Chalmers dealers everywhere. In Wisconsin and the upper peninsula of Michigan by the Drott Tractor Company of Milwaukee.

It didn't take State and County officials and contractors of the progressive State of Wisconsin long to realize that Continental Wagon Scrapers are the ideal low cost dirt moving unit for highway building, relocation and maintenance work. Eighteen counties in the Badger State are cutting costs with from one to three Continentals.

Wisconsin, Washington or West Virginia—it's all the same to a Continental—they dig while they load while they haul, and backdump like a truck, over a bank, against a wall, in tight places. They take cuts from wafer thinness to a foot thick, any kind of dirt quickly boiling up into the big bucket. They hog out and load anything the tractor can pull through: imbedded rocks, tree roots, gumbo, wet sticky clay, shot rock, etc., with a minimum of tractor power.

They level, grade, spread, dump in windrows, or stock piles. They use no maze of cables and sheaves, just simple, highly dependable hydraulic jack units. They require little maintenance and are still digging dirt long after they've paid for themselves many times over. Made in 4, 5, 7 and 10 yard sizes mounted on low pressure tires or crawlers.

They're the fastest dirt movers on wheels—ask the boys up in Wisconsin!



CONTINENTAL ROLL & STEEL FOUNDRY COMPANY  
Tractor Equipment Division  
14370 Railroad Avenue  
East Chicago, Indiana

## CONTINENTAL WAGON SCRAPERS

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**UNDISPLAYED RATE:**  
10 cents a word, minimum charge \$2.00.  
**Positions Wanted** (full or part-time salaried employment only), 1/2 the above rates payable in advance.  
(See ¶ on Box Numbers)  
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Box Numbers in care of New York, Chicago, and San Francisco offices count 10 words additional in undisplayed ads.  
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1 inch ..... \$6.00  
2 to 3 inches ..... 5.75 an inch  
4 to 7 inches ..... 5.50 an inch  
Other spaces and contract rates on request.  
An advertising inch is measured vertically on one column, 3 columns—36 inches—to a page.

COPY FOR NEW ADVERTISEMENTS RECEIVED UNTIL MAY 23RD FOR THE JUNE ISSUE

## JUST COMPLETED DAM CONTRACT READY FOR ANOTHER JOB AT LIQUIDATION PRICES! LATEST AND FASTEST TYPE OF DIRT MOVING EQUIPMENT



COMPLETION OF DAM CONTRACT, and FORCED REMOVAL, compel us to SACRIFICE this FLEET of 15 LATE MODEL EUCLID Trac-TRUKS, used on one job only, purchased new two years ago by large contractor. Regularly maintained by best of mechanics, and at present stored in Dry Garage at QUABBIN DAM, Enfield, Mass. Specifications—Gasoline operated—Waukesha 6 cylinder gasoline engines—12 yard capacity. All low pressure pneumatic tires on tractor and truck. Bottom dump hydraulically operated. Every unit can be seen running. Machines equal to new. Will sell one or all for twenty-five cents on dollar. Also will entertain proposition on rental or contract basis. Negotiations for purchase and arrangements for inspection should be made with our Brooklyn Office or Representative at project.

### ADDITIONAL CONTRACTORS EQUIPMENT AT BROOKLYN

- 1—Large Factory Rebuilt #8 Union Pile Hammer, following specifications: Weight 13,500 lb.—Energy developed per blow 19,850 foot pounds. Blows per minute 110—Boiler required 50 H.P. Cost new \$4,200. Our price..... \$2,500.00
- 1—Factory rebuilt 3/4 yard P&H shovel like new..... \$3,500.00
- 50—Rebuilt Ingersoll-Rand and Chicago Pneumatic Jackhammers—One fourth regular price.
- 4—30 Ton ALL STEEL STIFF LEG DERRICKS—Manufactured by American Terry Company—Complete with bull wheels, sills, all fittings, etc. 45 and 75' booms \$1,500.00 ea.
- 1—Midwest 12 Ton capacity—36 Gauge Gasoline Locomotive. New in 1933. Used three months. Price..... \$1,500.00
- 1—Set Fittings for bucket operating wood derrick..... \$200.00
- 1—130' Schramm Gasoline Compressor late model..... \$475.00
- 1—100' Ingersoll Hand Compressor..... \$550.00
- 1—310 Ingersoll Hand Compressor, rubber tire mount—gasoline operated..... \$950.00
- 1—Fair 450 H.P. late model Diesel Engines—Suitable any type stationary or marine work. Price on application.
- 2—Euclid Fire yard caterpillar mount crawlers—bottom dump—practically new. Price..... \$500.00 ea.
- 1—Model 100 Cietrac Tractor—No bull dozer Rebuilt..... \$1,000.00
- 1—Model 20 Caterpillar tractor—No bull dozer..... \$600.00
- 1—Complete HOKK CHUSING PLANT located Milburn, New York, consisting of No. 6 American Machinery Jaw Crusher—SN160087—1—42"x18" revolving Screen with gearing and

- 1 Bucket Elevator 30' centers—Price for the lot as is, where is..... \$1,000.00
- 1—Model 60 Caterpillar tractor—with bull dozer..... \$1,250.00
- 50—New 2—KW—Single cylinder—air cooled, light plants—33 and 110 volts..... \$150.00 ea.

### List of Equipment at Quebbin Dam—Enfield, Mass. THREE LARGE CORRUGATED IRON BUILDINGS to be dismantled by purchaser

- 1—Austin Roller, 5 ton, powered with Fordson gas motor #723333.
- 1—Portable Compressor, Chicago Pneumatic—Little Giant air Motor #24065—5 1/2"x5 P6D6L 6 Gas Motor #55391 4 1/2"x5 6 Model OXC Hercules.
- 8 SPECIFICATIONS EUCLID END DUMP TRUCKS
- 2—Euclid End Dump Truck #3—Truck No. 241—Motor No. 355795—Waukesha—Motor Model 68RK60R. (Other serial numbers all same series).
- 15—Euclid Trac-Truk—& Trailer #28—Truck No. 12WK29—Motor No. 361872—Waukesha—Motor Model 68RK60R, Trailer No. 42W1581. (Other serial numbers of same series.)
- 2—Ingersoll-Rand Wagon Drills—Serial No. 3996 with X71 Drifter #18395 and Air Hoist No. A3066.
- 1—Square Deal #20 Road Scraper, Ser. #5752, manufactured J. D. Adams & Co., Indianapolis, Ind.
- 1—Pressure Tank—Mass. Inspection 11' Long—4' Dia.

- 1—Pressure Tank—7 1/2' long—3 1/2' Dia.
- 1—Pressure Tank—4' long—2' Dia.
- 4—Pontoon—22'—3' Dia.
- 1—Gas Tank—5 1/2' long—4' Dia.

### OUTSIDE SHOP

- 1—Gasoline Locomotive Whitcomb, 4 ton—36" Gauge, Ser. #138-4-4261—Horse 4"x4 1/2".
- 1—Gasoline Locomotive Whitcomb, 5 ton, 36" Gauge Type C24—#12657—Motor continental type 102-#84-16050
- 1—Gasoline Locomotive Whitcomb, 5 ton, 36" Gauge Type C24-12656—Motor Continental Type 102 #85-16045.
- 1—Farrel Jaw Crusher—Size 24"x12"—Type B, belt driven.
- 1—Acme Jaw Crusher—size 20"x12" type 9AA Serial #1338—Belt Driven.
- 1—Gravel Washing & Screening plant, consisting of revolving screen 32"x15"—bucket elevator 25' C/C 6"x14" buckets, reciprocating feeder 14"x12", wash box 17"x40" wide, and necessary drive sprockets and chains, bote, entire plant is complete.
- 1—Blaw Knox steel 2 compartment bin bottom, with 2 quadrant dump gates.
- 1—Telesmith rotary grizzly and two feeders—grizzly 7'8" long, 4'0" dia. 8" spacing feeders each 36" wide, 6'0" long.
- 1—Stiff leg wood derrick, 50' boom, 19' mast—10' bull wheel.
- 7—Steel stone boxes, 4'0"x4'0"x4.
- 2—Steel Switch houses 4'0"x1'.
- 2—Norton 50 Ton Jacks.

Spare parts for Trucks, chain blocks, office furniture, Etc.

## BROOKLYN CONTRACTORS MACHINERY EXCHANGE, Inc.

"EVERYTHING FOR THE CONTRACTOR"

Office and Warehouse 574 HAMILTON AVENUE, BROOKLYN, N. Y.

## ROAD MACHINERY FOR RENT

Practically New Demonstrator Models with Factory Guarantee—First 60 Days' Rent Can Be Applied toward Purchase if Desired—REAL BARGAINS, ACT QUICK!

### BITUMINOUS PAVERS:

- 2—9-12 Ft. Adjustable Pavers, late model with semi-crawler wheels. Heated Screeds at small extra cost.

### REBUILD FINISHING MACHINES:

- 1—9-11 Ft. Finisher
- 1—15-20 Ft. Finisher
- 1—30 Ft. Gas Electric Finisher
- 1—30 Ft. Vibratory Finisher

### MIX-IN-PLACE ROAD BUILDERS:

Combination Traveling Pug Mill and Spreader Finisher, for One-Pass Mixing and Finishing of Bituminous Retread or Stabilized Base.

- 1—Model MP-1, Tractor Drawn Road Builder for light bitreaid or stabilization, complete with screed and leveling attachment—55 H.P. engine on pug mill.

- 1—Model MP-2 Self-Propelled Road Builder for heavy mat or stabilization work. Twin pug mill, crawlers, screed and leveling device for mixing and finishing in one pass. 150 H.P. engine.

ALSO A FULL LINE OF MIXERS, PUMPS, HOISTS, TOWERS, SIDE DISCHARGE TRUCK MIXERS, SPECIAL ROAD GRADERS, CONCRETE SPREADERS, etc., for sale or rent. Write us for astonishingly low prices or rental terms.

THE JAEGER MACHINE CO.  
890 W. Spring St., Columbus, Ohio

## Mr. American Manufacturer

A Canadian Manufacturer, located in the Province of Ontario is interested in hearing from a Manufacturer of Road Machinery or other Steel Equipment in the United States, who would consider establishing a connection whereby their products would be made and sold in Canada under agreement. The Advertiser has limited capital and at present has limited facilities for the handling of heavy material but is desirous of developing under the guidance of a well established and preferably internationally known firm.

BO-117, Construction Methods,  
330 W. 42d St., New York City.

## NEW "SEARCHLIGHT" Advertisements

must be received  
by May 23rd to  
appear in the  
June issue.

Address copy to the Departmental  
Advertising Staff  
Construction Methods and Equipment  
330 West 42d St., New York City

## If You Are in Need of Used Construction Equipment

Check the advertisements on this page for items available for immediate release.

If you cannot locate what you want, or, if additional equipment is needed—send us a list of your requirements and we will gladly put you in touch with sources of supply. Address requests to:

Departmental Staff

CONSTRUCTION Methods and Equipment  
330 West 42nd Street, New York



# "CONSTRUCTION COSTS," year book of the construction industry combined with **ENGINEERING NEWS-RECORD**

The year book formerly known as "Construction Costs" becomes the **Construction Cost Guide** issue of **Engineering News-Record**, the 1938 edition appearing June 30 . . . . For subscribers there is no extra charge . . . . \$2.00 for non-subscribers and for each extra copy . . . . Invaluable for preparing bids, for planning and financing projects, for evaluating and appraising, for checking and wage determination . . . . **Engineering News-Record's** biggest value to readers and to advertisers . . . . Nowhere else between two covers will engineers and contractors find such a variety

ety of basic data . . . . The advertising pages will contain buying information on equipment, materials and supplies of leading manufacturers . . . . Many organizations will want extra copies for the reference use of different departments . . . . The established features of **Engineering News-Record** will be retained . . . . Print order will be limited to subscribers plus those whose orders reach us before June 27 . . . . Why take a chance on remembering to order later? Order now and avoid disappointment . . . . Use the coupon.

**1938 EDITION  
to be published  
JUNE 30**



**AVOID DISAPPOINTMENT . . . ORDER YOUR COPY NOW!**

Editor,  
Engineering News-Record,  
330 W. 42nd St., New York.

Reserve . . . . . copies of the Construction Cost Guide Issue of Engineering News-Record, published June 30, and bill me at two dollars per copy.

Name . . . . .

Company . . . . .

Address . . . . .

☐ P. S. Enter my subscription to Engineering News-Record for one year at \$5.00, check enclosed. This entitles me to one copy of the Construction Cost Guide issue free of charge.

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*Faster—More Economically*

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## GRIFFIN WELLPOINT SYSTEMS

33 1/3% more efficient

The ONLY wellpoint with water inflow  
through entire screen circumference.  
WHY?—Because no solid rods or flutes  
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GRIFFIN WELLPOINT CORP.

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STRUCTION METHODS  
AND EQUIPMENT.

Your problems of selling,  
buying or "swapping" equip-  
ment are duplicated with *other*  
readers BUT —

Still *OTHER* readers can pro-  
vide the solution of your prob-  
lem if they *know what it is!*

Tell them! Here! Through  
classified advertising in the  
Searchlight Section of "CON-  
STRUCTION METHODS  
AND EQUIPMENT" — *your*  
business paper and *theirs*.



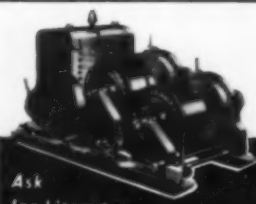
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**Sterling**  
MACHINERY CORPORATION

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CONCRETE BROOMS of Brass or Bassine.

**L. and M. MANUFACTURING COMPANY**

Division of Mondie Forge Company, Inc.

10300 BEEBE ROAD, CLEVELAND, OHIO

## New Advertisements

must be received by the 23rd of the month  
to appear in the issue out the next month.

Address copy to the Departmental Advertising Staff  
CONSTRUCTION Methods and Equipment  
330 West 42d St., New York City

# CONSTRUCTION Methods and Equipment

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# OF ALL FIRST ORDERS FOR TRU-LAY PREFORMED REPEAT

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Since its introduction fourteen years ago at least 95 per cent of all those who buy TRU-LAY Rope for the first time on our recommendation—come back for more. There is no better acknowledgment of superiority.

The reasons for this high percentage of repeat business are many. In the first place, TRU-LAY Preformed is easy to handle; fast to reeve. It resists kinking and whipping; it spools perfectly on the drum. It has remarkable resistance to fatigue and so lasts longer—*much* longer. Having long life TRU-LAY reduces the frequency of machinery shutdowns thus saving idle time of both men and machines.

Specify TRU-LAY Preformed for your next rope. Learn, on your own equipment and with your own men, the real dollar value of this *original* preformed wire rope.

**AMERICAN CABLE DIVISION  
AMERICAN CHAIN & CABLE COMPANY, INC.**

WILKES-BARRE, PENNSYLVANIA

District Offices: Atlanta, Chicago, Detroit, Denver, New York, Philadelphia, Pittsburgh, Houston, San Francisco

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AMERICAN CHAIN & CABLE  
INDUSTRIAL PRODUCTS

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**FORD CHAIN BLOCK DIVISION**  
Chain Hoists • Trolleys

**HIGHLAND IRON & STEEL DIVISION**  
Wrought Iron Bars and Shapes

**MANLEY MANUFACTURING DIVISION**  
Automotive Service Station Equipment

**OWEN SILENT SPRING COMPANY, Inc.**  
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Traffic Tape • Welding Wire

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Valves • Electric Steel Fittings

**READING STEEL CASTING DIVISION**  
Electric Steel Castings, Rough or Machined  
Railroad Specialties

**WRIGHT MANUFACTURING DIVISION**  
Chain Hoists • Electric Hoists and Cranes

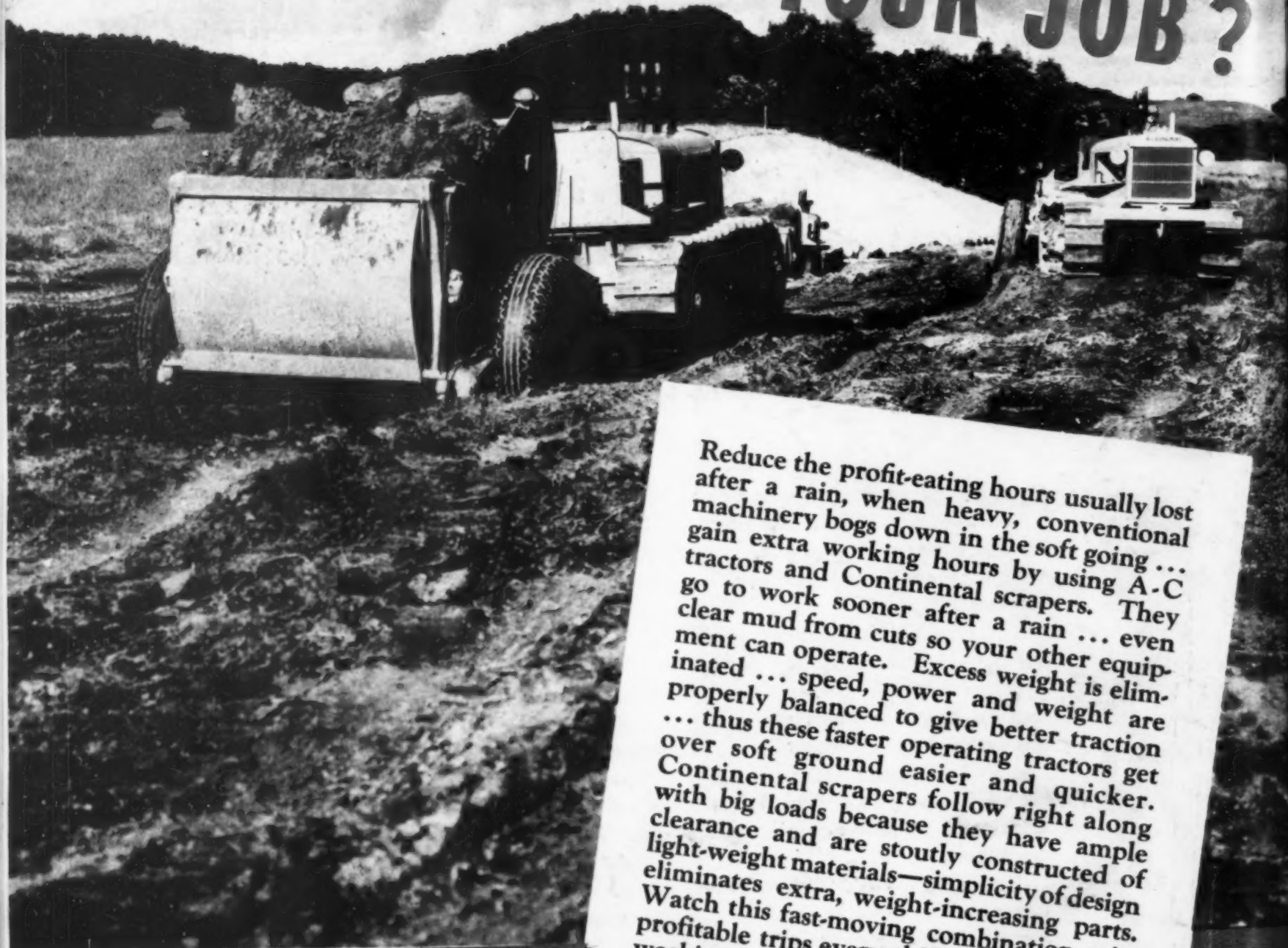
*In Business for Your Safety*

# TRU-LAY *Preformed* WIRE ROPE

ALL AMERICAN CABLE DIVISION ROPES MADE OF IMPROVED FLOW STEEL ARE IDENTIFIED BY THE EMERALD STRAND

May, 1938 — CONSTRUCTION Methods and Equipment

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Reduce the profit-eating hours usually lost after a rain, when heavy, conventional machinery bogs down in the soft going ... gain extra working hours by using A-C tractors and Continental scrapers. They go to work sooner after a rain ... even clear mud from cuts so your other equipment can operate. Excess weight is eliminated ... speed, power and weight are properly balanced to give better traction ... thus these faster operating tractors get over soft ground easier and quicker. Continental scrapers follow right along with big loads because they have ample clearance and are stoutly constructed of light-weight materials—simplicity of design eliminates extra, weight-increasing parts. Watch this fast-moving combination gain profitable trips every shift. Increase your working time and increase the amount of work you can do in that time.

SEE YOUR ALLIS-CHALMERS DEALER!

LO's and Continental scrapers working on a rain softened fill near La Crosse, Wisconsin

## ALLIS-CHALMERS

TRACTOR DIVISION—MILWAUKEE, U. S. A.

*Controlled Ignition*  
**OIL TRACTORS**